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TREATISE

ONTHE

DELUGE.

CONTAINING

I. Remarks on the Lord Bishop of CLOGHER'S Account of that Event.

II. A full Explanation of the Scripture History of it. III. A Collection of all the principal Heathen Accounts.

IV. Natural Proofs of the Deluge, deduced from a great Variety of Circumstances, on and in the terraqueous Globe.

AND.

Under the foregoing GENERAL ARTICLES,

The following Particulars will be occasionally discussed and proved, viz.

The Time when, and the Manner how America was first peopled.—
The Mosaic Account of the Deluge written by Inspiration.—The
Certainty of an Abys of Water within the earth.—The Reality
of an inner Globe or central Nucleus.—The Cause of the subterranean
Vapour and of Earthquakes.—The Origin of Springs, Lakes, &c.
—The Formation of Mountains, Hills; Dales, Vallies, &c.—The
Means by which the Bed of the Ocean was formed.—The Cause
of Caverns or natural Grottos; with a Description of the most
remarkable, especially those in England.—Also an Explication
of several lesser Phænomena in Nature.

Adorned with a Copper-Plate, representing the internal Structure of the terraqueous Globe, from the Center to the Circumference.

BY A. CATCOTT, LECTURER of St. John's, in the City of BRISTOL.

LONDON:

Sold by M. WITHERS, at the fewer Stars, in Fleet-fireet; and D. PRINCE, in Oxford, 1761.

Where also may be had, -REMARKS on the Lord Bishop of CLOCHER'S Explanation of the Mosaic History of the Creation and Formation of this World, &c.

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BOUT five years ago I published fome REMARKS on the Lord Bp. of CLOGHER's Explanation of the Mosaic Account of the Creation and Formation of this World; and intended that this Tract should have followed soon after, as a kind of Second Part: but before I could quite finish it, I was seized with an illness, which affected my fight in fuch a manner, that I was obliged to lay afide all thoughts of compleating it (tho' nearly finished) for three or four years: and it was not without several relapses, that I could bring it to the state in which it is now prefented to the reader.

Soon after the publication of the first Tract, his Lordship of Clogher (the late Rev. Dr. Clayton) also died; on which account (and for the reasons mentioned, page 8.) I have in a great measure dropped the controverfial part in this; having only felected one or two principal Articles, that I thought exceptionable; and these, not so much because his Lordship. had afferted them, as because several, otherwise learned and ingenious, writers had maintained the same; and it appeared to me to be of some consequence to fettle the truth.

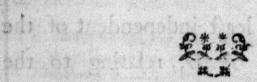
To pretend to introduce Novelies in Natural Philosophy in this enlightened age, may be esteemed by some almost as bad as to presume to make new discoveries in Religion: and yet, some points

discussed in this Tract, may possibly be new to many. In order therefore to remove this formidable, though in itself weak, objection, I have frequently chosen to make use of the words of any other writer (that had expressed himself judiciously on the point) rather than my own: which also is the reason, why several quotations will be found in this Tract, that otherwise might have been omitted.

It may be proper to inform those, who have encouraged the publication of this Tract by their Subscriptions (to all of whom I desire my sincerest Thanks for their savours), that it is a distinct Treatise of itself, at least independent of the above-mentioned Tract, relating to the Creation, &c. the sew particulars in That,

which were explicative of This, being introduced in their proper places, or similar explanations given.

Some of my Subscribers may possibly find a difficulty in understanding the Mosaic Account of the Flood, as philosophically explained in the former part of this Tract, I would therefore advise such first to make themselves well acquainted with the Copper-Plate, and the Explanatory Notes belonging to it, p. 54; and then, I hope, there will be no great difficulty in comprehending it; or at least a second perusal will make the whole plain and clear.



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THE

CONTENTS.

The state of the s	
Preliminaries.	Page
THE Mosaic account of the Deluge full and complete, not too short or imperfect, as some have imagined	· 3
The nature of the Miracle exerted to effect the Deluge	3— 8
The manner in which the Author proposes to examine his Lordship of Clogher's account of the Deluge; with some strictures on that account	8—16
A full Explanation of the Scripture History of the Flood.	
GEN. vi. 13. And God faid unto Noah, The end of all flesh is come before me;—and behold I will destroy them with the earth; paraphrased; and the Universality of the Deluge urged therefrom	7—18
Ver. 14. Make thee an Ark of gopher-wood.	

Ver. 14. Make thee an Ark of gopher-wood, (rooms shalt thou make in the ark) and pitch it within and without with pitch.—A window shalt thou make to the Ark.—And of every liv-

CONTENTS.

	Page
ing thing of all flesh, two of every fort shall thou bring into the ark to keep them alive, &c. —Thus did Noah, according to all that God commanded him, so did he, The necessity of Divine Instruction in order to execute the above Command, and the certainty that all creatures perished that were not within the intent of that instruction, shewn	8-25
GEN. vii. 11. And the same day were all the Fountains of the GREAT DEEP broken up. What the Great Deep or Abyss is, explained a	5 6
And in order to flew the full meaning of the Event here related, a brief explication of the first Formation of the earth is introduced.	
GEN. i. 2. And the Spirit of God moved upon the face of the waters	6 9
And God said, Let there be Light and there was Light	29
And God said, Let there be a Firmament in the midst of the waters, and let it divide the waters from the waters, &c.	19 34
And God said, Let the water under the beaven be gathered together unto one place, and let the	34 6
GEN. vii. 11. And all the fountains of the Great Deep were broken up. The manner how this	37—40
And the Windows of beaven were opened. Explained; and the Dissolution of the earth proved therefrom; with other texts denoting	40—44

CONTENTS.	Page
Ver. 12. And the Rain was upon the earth for days and forty nights: and the waters increase and hare up the ark:—And the waters prevailed upon the earth exceedingly; and all thingh hills, that were under the whole heave were covered: The Universality of the D luge urged from this passage	ty ed e- be n,
Ver. 24. And the waters prevailed upon the ear an hundred and fifty days. What this prevalence of the waters was, explained	a-
Gen. viii. 1. And God made a Wind [the Sprit] to pass over the earth, and the water assumed. This Wind shewn to be the same as the Spirit that moved upon the face of twaters at the beginning	ers ne
Ver. 2. The Fountains also of the Deep, and windows of heaven were stopped, and the refrom heaven was restrained; paraphrased of	in
Ver. 3. And the waters returned from off earth continually. How this event was broug to pass, shewn	
Ver. 4. And the Ark rested upon the mountains Ararat, &c	of - 51
Ver. 8. And Noah sent forth a dove from he to see if the waters were abated from off	the
face of the ground, &c	iod iit- ith

A Collection of the principal Heathen Accounts of the Flood.

The Roman description as given by Ovid56-8
The Grecian, Syrian and Arabian as recorded by Lucian 58-60
The Egyptian, as retained under the history of Osiris and Typhon, from Plutarch60-1
The Babylonian, as preserved by Josephus and Berojus 4
The Assyrian, from Abydenus, as recorded by Eusebius 64
The Persian, from Dr. Hyde's Historia veterum Persarum, &c 64-5
The Accounts of the Flood as retained by the inhabitants of the East-Indies 8
- As preserved among the Chinese6870
The descriptions of it as given by the several nations of America, in general 70- 2
In particular, by the nation of the Iroquois - 72
By those of Cuba 3
By the inhabitants of Terra Firma 73
By the Peruvians 4
By the Brasiliens 6

CONTENTS. Page Some Conclusions, deduced from the above more I to Accounts, respecting the Certainty-that there has been a Flood, -that it was Universal,-and that the Mosaic Description of it was written by Inspiration - - - 76- 82 The Time when, and the Manner how America was first peopled - - - - - 83- 99 the was so toll on the way Well toll Natural Proofs of the Scripture Account of the Deluge, deduced from a great variety of circumstances, on and in the terraqueous Globe. I. Proofs of the Abyss, O R. That there is a quantity of Water in the infide of the Earth abundantly fufficient for answering the Effects of the Deluge as defcribed in Scripture. This proved 1. From the Quantity of water that is -poured into the Ocean from the mouths of all the Rivers upon Earth - - - - 101- 12 2. From the Quantity of water that is thrown out at the beads or fources of all the Rivers - - - --II2-3. From Whirlpools, Under-currents, and Gulpbs in the Ocean 4. From Lakes - - - - - - - - - - - - - - - 48 5. From Phanomena attending Earthquakes 148- 52

8

0

1

CONTENTS.

6. From accidental discoveries of waters, rivers, &c. in the inside of the earth152—	58
II. Proofs of the Universality of the Flood;	
. 00 88 O.R D. Tobo Rid any see	
That the Waters of the Deluge covered the whole surface of the earth. This proved	i M
1. From the division of the Surface of the earth into Mountains, Hills; Combs, Dales, Vallies, &c 159—	- 88
2. From the Nature, Form, and Situation of several Substances that at present lie loose upon the surface of the Earth 189-2	32
3. From Caves, natural Grottos, Swallet- boles, &c 232-	50
4. From the numerous Spoils of sea and land Animals and Vegetables now found buried in all parts of the earth	60
III. Proofs of the Dissolution;	
of the state of th	
That, during the Deluge, the whole earth was dissolved, all the mineral and metallic matter being reduced to its original corpuscles, and assumed up into the Water. This proved	
1. From the outward Form of the Earth - 26	ía.
2. From the fame	7

CONTENTS:
3. From the present Solidity of the Earth -262—
4. From the Veins in most sorts of Stone -263-
5. From the Interchange or Mixture of dif- ferent strata 264—
6. From the Formation and Situation of No-
7. From extraneous Fossiis 266-
8. From the internal Structure of the Shell of the Earth 268—
Corollaries; and Objettions answered270—
IV. Of the Re-formation,
OR
Consolidation of the terrestrial parts after the Dissolution
A Paraphrase of the 104th Psalm280-
Appendix, containing some corroborating arguments for the manner in which the Author supposes America to have been first peopled 285—296

58

8

ERRATA.

Page 12. Line 32. dele such.—p. 38. 1. 2. read rend.—p. 44.
1. 9. r. orbit.—p. 53. 1. 32. r. Polybius.—p. 58, 1. 27. r. where.

Any literal error the reader will correct for himself.

CONTENTS.

g. Eram the property solding of the Land. . 262 - 1 g

Train to Service to Service of the Property of

S. Production that to be be and transferred that the best of the second to be a s

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EFORE I proceed immediately to the discussion of the subject I am to treat of, it may be proper to premise a few articles.

THE Mosaic description of the Deluge has been accounted by several to be too short and concise for the due relation of so important an event: but those who make this objection seem not rightly to understand the nature of the case; the proper stating of which will serve for a full answer to the objection.

First then, Let it be considered that as at the time of the Deluge the Earth was destroyed, broken to pieces, reduced to its chaotic state, or un-formed, and afterwards, formed again; and this, its fecond Formation, answerable, both in the manner and means, to its first and original (for similar expressions are used, and the same causes are mentioned to have been employed, in both cases) and as a description had been

given at large of the manner of the first formation in the Mosaic narrative of the Original of things; so it would be needless to have enlarged on that point in the account of the Re-formation of the earth at the deluge; just mentioning the chief articles would be fufficient, as every judicious reader would naturally recur to the first and fuller description. Be-As many of the effects of the Deluge are fides. legibly written in the book of Nature, being engraved in the deepest characters in the hardest rocks all over the earth; fo those, who would be at the pains to read this book, who would go up as high as the hills, and down to the vallies beneath, and enter into the dark chambers of the earth (carrying the divine light in their hands) should find the inestimable treasure, should fee that the world had been destroyed, and formed again, and in what manner this furprifing transaction had been effected; and would by this means have full proof—that there is a God,—Who that God is,—and that he governs the world. And they, who would not be at this pains (or liften to those that had been) did not deserve this peculiar proof and knowledge. ficient be it for Gob, and even gracious must we esteem it, that he informs us of such and such things in his Word, and gives us eyes to fee the rest or another part of the evidence in Nature: and they who will neglect either or both of these proofs, may deservedly remain so far in ignorance. Gop indeed will do for us what we cannot do for ourselves; but we must not expect that he will do what we can do: This would be to undo what himself had before done, or give us power on purpose to take it away, and give it us again; and would also be encouraging sloth, idleness, and the difuse of our rational faculties. Therefore to spur up our abilities and quicken our diligence, he gives us That whereon we may reason, and then justly leaves us

points I think are manifest; first, the ignorance and inexcusableness of those, who have spoken against the mosaic account of the Deluge as impersect and desicient; secondly, how unqualified those persons must be to give a true account of the Deluge, that have not examined Nature, but sat down at ease in their studies, drew lines upon paper, &c. vainly imagining that the form and inclination of Rocks, courses of Rivers, veins of Ore, and the situation of things in the solid earth, would shape and wind themselves according to their fancies.

Another article necessary to be settled, as preparatory to the subject I am to speak of, is, in what manner and bow far the Divine Interpolition is to be allowed in the Miracle of the Noachian Deluge, or in destroying and re-forming the earth at that time. For as in my interpretation of the account of the formation of the earth, I have had (because Scripture directed me) much recourse to the mediation of Natural Causes, or endeavoured to explain it philosophically, and I shall do the same, (because I think I ought) with regard to the Deluge, fo I would obviate an objection, which an inattentive reader might make to fuch kind of explanations, as the they took away or lessened the Divine Power in the fact related. But I trust, upon examination, we shall find, that this way of explicating or unfolding Miracles, will manifest the Wisdom and Goodness as well as the Power of God, and in a manner too, far superior to any other. When an extraordinary effect is performed, to tell a person,that God did it; -and there rest, without explaining the end, the means and the manner of doing it, is lofing great part of the evidence of the miracle, and the intent for which it was performed; and is generally B 2

spoken as a cover for our ignorance, or rather our pride, which is piqued at a difficulty we cannot folve. But God is a God of order, and when things are done for the fake of man, he adapts his operations to the state and circumstances of man. Now it is an allowed truth, that the situation of man in this world is such, that he is confined for his ideas, the foundation of his knowledge, to sensible or material objects; and it is alfo certain, that the prevailing Idolatry, both long before and long after the time of Moses, even almost from the creation of man to the coming of Christ, was the worshipping the Natural Agents or some Part or other of the System of Nature, instead of GOD the Creator and Former of all. Such then being the state of man and fuch the peculiar circumstances of the former world, the most suitable method to destroy this idolatry would be, to over-rule, suspend, or divert the common course of the Natural Agents; which would undeniably prove, that they had a Superior, one who could turn them, whitherfoever be pleased. And when such an act was performed, the part of man would be, to discover the propriety of the Agent or Agents, over-ruled or suspended, on particular occasions; and trace out how appositely the Means conduced to the End. I shall illustrate and exemplify my meaning from that publick and grand dispute between Jehovah and Baal, under the conduct of Elijab and Baal's prophets, recorded 1 Kings xviii. which the reader is defired to peruse. The Contest here was concerning the true God, whether Jehovah or Baal, or rather who was the Ruler (for that is the meaning of

The Writings of the Greeks and Romans abundantly testify the same, as several Authors have shewn at large. Particularly Parker

in his Tentamina Physico-theologica de Deo.

Deut iv. 19. xvii. 3. 1 Kings xi. 5. 2 Kings xvii. 9. xxiii. 4. &c. 2 Chron. xiv. 3, 5. Job xxxi. 26—29. Jerem. vii. 9, 18. viii. 1, &c. xix. 4, 5, 13. xxxii. xliv. Ezek. viii. 15, 16. xxiii. 30, 37. Wifd xiii. 1—4.

the word Baal in the Original) the material Heavens or Agents, or any Being above them. JEHOVAH had already shewed himself superior to the Heavens (at least, to every unprejudiced mind) by having suspended their power or action in giving dew or rain for above three years; (see 1 Kings xvii. & xviii. Luke iv. 25.) but Baal's followers regarded not this; for all that time they eat at the royal [Jezebel's] table, and lived in plenty; verifying a common observation, that as long as men have enough of this world, they are not apt to be very folicitous about the Governor thereof. But the famine increasing more and more, the king and his servants are obliged to go from home, and feek in different places for food for themselves and cattle; and God at last out of compassion to his people sends Elijab to meet the king, and have the contest decided at once. That Elijah's God had power over the Water of Heaven, was pretty plain; he now proceeds further, and will shew that he has power over its opposite, the Fire, and can make it act or cease from acting just as he pleases; and from Ferem. xix. 5. it is evident that Fire (which is the most powerful operation of the Heavens or Air) was esteemed sacred to Baal,—they have also built the high-places of Baal, to burn their fons with fire for burntofferings unto Baal. The Test, agreed to on both sides then was,—that the God which answereth by fire, and consumeth the offered vittim, He should be Goo: and if Baal could answer by any thing, it certainly must be by one of his own emblems. The place chosen for the scene of action was Mount Carmel, which probably these idolaters had made an bigb-place of to Baal; fince we are told, they had broken down the altar of JEHOVAH Thus Elijab grants them every favourthat was there. able circumstance. And when they had called upon their God from morning even until noon (when the Heat, the greatest power of the day, was come) and in their

furious fits of madness and despair had leapt upon their altar, and cut themselves with knives and lancets; but neither voice came, nor any to answer, nor any that regarded:-then Elijab repaired the altar of the LORD, and laid thereon a facrifice; and to shew the mighty power of God, ordered a great quantity of water to be poured on the facrifice and the altar, so as to fill a trench that was drawn round about it; and by this means render the facrifice less susceptible of the action of Fire; and take off all possible suspicion of deceit. things thus prepared, Elijab invokes his God to give the decifive proof of his Deity; and immediately, at his request, Fire streams down from beaven, consumes the offered victim, and licks up all the water in the trench. At which striking, visible manifestation of the Superiority of Elijah's God, all the people fell on their faces, and cried out, JEHOVAH, He is GOD; JEHOVAH, He is GOD. And a greater proof of Divine Interposition could not be desired, nor one more applicable to the purpose be given. Here the Heavens were made,-in a particular place, at an appointed time, in an interesting dispute,—to exhibit their strongest operation, Fire, and pour it down in honour of a facrifice dedicated to Jehovah, and were with-held from doing the fame on a facrifice dedicated to themselves: and so themselves in fact forced to confess their own inability, bring confusion on their own votaries, and give glory to the true Gon. - Such also was the case at the Deluge. The grand object of false worship then was, the Natural Agents or some part or other of the System of Nature, as those words of God, Gen. vi. 17. (the prelude to that dreadful catastrophe) indicate: And behold, I, even I, do bring a flood of waters, &c. 'It is not faid, Let there be, or let the Agents which I bave established, or let us bring; but I, even I, in direct opposition to all the Laws of Nature, or

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powers established in Matter.' But the means used in. and the manner of, the execution declare this plainer. As the Corruption of mankind before the flood was remarkably great, and the Imagination of their beart only evil continually, it could not well be in fuch a general Apostacy, but that many objects of false worship would be fet up; fome imagining one part, others another part of Nature to be Supreme. But from the manner of their punishment the three principal Deities feem to have been, the Air, the Water, and the Earth: the first, the heathen Jupiter; the second, Neptune; the third, Terra. Accordingly God to defeat this idolatry, and manifest his power over Matter, inverted the order and natural State of These in particular; he made the Air to descend into the place of the Water, that lay beneath the earth, and the Water to occupy the place of the air, and by the passing and re-passing of these two agents thro' the Earth, the shell or orb thereof would be torn to pieces, its folid form reduced to fluid (of each of which effects more explicitly hereafter) and all the idolatrous inhabitants destroyed by the very Means or Agents they depended on for fuccour. Thus the true God demonstrated his power over Matter; and tho' he made use of material Means, yet the Act was undeniably supernatural, above all the laws and powers of nature. The Natural Agents could not, or if they could, they certainly would not, have overturned their own empire, punished their own votaries, and suffered themselves to be made the instruments of punishing them. This manner of working miracles is eminently striking, and indeed irresistable; as it affords man sensible and material evidence, is level to the conception of all, and was peculiarly adapted to the state of the world, when fuch kind of miracles were wrought.

Thus much I have premised in general:

In particular, with regard to his Lp. of Clogher, I propole not to attend him, step by step, in his account of the deluge, as I have done in his explanation of the Scripture account of the Formation; because replying to one, is much the same as answering the other; fince the Deluge is a parallel act (only in an inverted order) to that of the first Formation, as I have obferved already, and which will more evidently appear in the process of this treatise. I shall therefore only felect one or two of the most exceptionable parts of our Author's account of the Flood, examine them, and have a principal regard to them in explaining that event. I hope also to lay down such a clear and full description of the deluge, that any one by comparing his Lp's tract with this, may determine for himself where the truth lies.

THE chief exceptions I have to his Lordship's account of the Flood relate to the Extent of it; first with respect to the inhabitants of the earth; secondly, with regard to the Earth itself, or its solid, metallic, and mineral part. In each of these points he is of opinion that the effects of the Deluge were not universal, but only partial.

'And therefore (says he, p. 171, concerning the first) altho' I look upon that part of this [scripture]

' narration, relating to the destruction of mankind, and of birds, and of beasts, at the Deluge, to be

' literally true, in respect only of that part of the

world, in which Noah lived before the flood, and which was afterwards peopled by his three

' fons, Shem, Ham, and Japhet, yet I cannot but acknowledge that this Deluge, which happened in

the time of Noah, must have been general in some

degree; as manifestly appears from the general

' elevation of mountains over the whole world, and

from the immense quantity of sea-shells, which are frequently found in the most distant regions of the earth. Nevertheless I cannot but suppose, that other parts of the then habitable world, which by the force of the Deluge were separated into islands. and were divided from the continent whereon the ark alanded, were in some fort exempted from the com-' mon calamity, brought upon the rest of the world by the Deluge; inalmuch as the Continent of Ame-' rica, and many Islands in the East-Indies, are at present partly inhabited by wild beasts and noxious animals, which it is not reasonable to imagine, that ' any body could, or would, have imported thither ' fince that time. Therefore, I own, I cannot fee any other probable folution of this difficulty, than ' to suppose them protected by the Providence of God from the general destruction, in some extraor-' dinary manner, for the propagation of their own ' species.' Which passage, I humbly apprehend, is scarce consistent with itself; at least the position, that is laid down therein, will not coincide with other parts of the author's treatife; and is contrary to Scripture and Reason. His Lp. seems to forget, that, according to his System, but a very small part of the world was, or indeed possibly could be, inhabited before the flood, viz. that tract of land only which lay between the Northern Tropic and the Arttic Circle (fee of his Treatife, p. 74, 75) there being a great 'belt of water under the equator (equal in extent to the ' space between the two Tropics; see PLATE 3d.) which separated one part of the earth from the other; fo that only one of the Hemispheres [if the ' above-mentioned trast could be properly called an bemisphere] was the seat of the habitation of the sons of Adam before the Deluge, p. 65, 75.' If such was the fituation of mankind before the flood, had

even the far greater part of America been exempted from the effects of the deluge, no inhabitants of the former world would have been faved on it; much less could any have been faved by exempting the Islands of the East-Indies from that destruction; because they lay either directly under, or quite on the other side of the aforesaid great belt of waters; and so could not possibly have been inhabited before the flood. Besides; as according to his Lp. the falling down of this great belt of waters, or 'their rushing from under the equator [the higher ground] towards 'the poles' [the lower] (p. 155.) was one great cause of the deluge, so it could not but be, that such a violent efflux of water running in this direction would drive all the then inhabitants of the world towards the Northern Pole; where if they arrived, they must, according to himself, ' have perished on account of the Nay, what is more, he afferts, that the waters thus rushing from under the equator 'would return to their natural and original fituation of over-' spreading the whole earth,' p. 155, in the manner they did on the first day of the Formation, before the least spot of Dry-land had appeared. Now how we can reasonably allow, that any persons, in such an univerfal flood as this, could escape being drowned, I cannot conceive. But even let us suppose, that some of them were expert fwimmers, and could live a long time in the water, yet according to our author's further defcription of the deluge, they certainly could not be able to weather out the whole storm, for thus dreadful was it, 'When the fountains of the great Abyss were broken up, and an immense hollow was excavated out of the earth from pole to pole, as a bed for the ' fea to lye in; when the rocks, and the fands, and the shells, and the earth, that were taken thereout, were thrown upon the land, and raifed in mountain h

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upon mountain, so as to assail the skies and invade the region of the clouds: And when this heretogeneous mixture was showered down again upon the earth, it did not only rain, but the water, and fand, and earth, and rock, and shells, were poured down in cataracts from heaven, for forty days, over the face of the whole earth, p. 88, 153, 118. Surely in such a terrible storm as this, neither the least, nor the greatest, nor the strongest animal, could escape being dashed to pieces, much less a poor, destitute, affrighted, naked man: So that it must have required a miracle, far greater than That by which Noab and his family were faved, to have preserved one such per-And fince Gop took fo much care and allowed fo much time for the preservation of a few just souls, we cannot imagine, that he would fuffer, by a more extraordinary miracle, a number of wicked to furvive; for whose sake, and purposely to destroy whom, he brought the deluge upon the world, and put even the righteous to a severe trial of their faith in and depend-This certainly is contrary both to Scripture and Reason; as will be shewn more fully hereafter.

But his Lordship imagines, that the Text will authorise his supposing that some didescape; which therefore must be examined. He says, that the writers of Scripture 'frequently put the whole for the greatest 'part,' p. 168. and would therefore conclude, that the words All and Every used in the account of the slood, as 'All sless died, and Every living substance was de'stroyed, &c. ought to be understood with certain li'mitations,' p. 170. and therefore we may suppose, that All were not destroyed. That the words All and Every are sometimes used in the Scripture to signify an integral part, is very certain; and I believe, there is no language in which they, or synonimous

terms, are not fo used. Since they are words which occur so often, and in such a variety of senses, it would have required much circumlocution to have defined, in every instance, their precise meaning; the Context therefore is always left to determine that point. Now, the sense, in which these words are used in the Scripture account of the Deluge, is so fixed and determined, that it cannot possibly be mistaken. Moses fays (after he had related, that the waters of the flood had rifen to fuch a height, as to have covered All the bigb bills under the whole beaven) And ALL FLESH died. that moved upon the earth, both of FOWL, and of CATTLE, and of BEASTS, and of EVERY CREEPING THING that creepeth upon the earth, and EVERY MAN. All in whose nostrils was the breath of life, of all that was in the dry land died. And every living substance was destroyed which was upon the face of the ground, both man, and cattle, and creeping things, and the fowl of the heaven; and they were destroyed from the earth; and NOAH ONLY remained alive, and THEY that were with him in the ark, Gen. vii. 21. Had Moses intended to declare that every individual living creature that was upon the Earth, before and during the flood, were destroyed by the flood, he could not have been more express and particular; he fays, that every living substance, both man, and cattle, and creeping thing, and fowl of the air, that was upon the face of the ground, or in the dry land, died; and we know of but one ark which went upon the face of the waters, and so saved the men and the animals therein: of course, according to the Scripture account, there was no living creature upon the face of the whole earth, but fuch perished by the flood. And what shews this plainer is, that those, who miwe know, were exempted from this, otherwise, universal destruction, are expressly mentioned to have been faved; and their preservation mentioned too in such a manner as to specify, that no

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other persons or creatures were faved, And NOAH ONLY remained alive, and THEY that were with bim in the ark. Nay, St. Peter describes this affair still more circumstantially, and fixes the very number that were delivered. I Epift. iii. 20. wherein [i. e. in the ark] FEW, that is, EIGHT fouls, were faved by water; and again, 2' Epift. ii. 5. God spared not the old world, but saved NOAH the EIGHTH person [who with his own wife, his three fons, and their three wives, was just the eighth person] bringing in the flood upon the WORLD of the UNGODLY. All the ungodly therefore must have perished. So that the words all and every in the above passages must be taken in the largest latitude, and extended to the utmost universality, with regard to the wicked. I may just add too, (for as many have urged the above objection against the Universality of the Flood, so I would willingly remove it by every means without being tedious) that each of the arguments, which will be hereafter brought, especially those from Scripture, in proof of the Universality of the Deluge, will shew also, that the words all and every are to be understood in the sense I contend for; because Scripture (as God was its author) must be consistent with Itself, and with Truth.— His Lordship's difficulty concerning the peopling of America, I propose to give an easy solution to hereaster, observing here by the by, that whether we could get over this difficulty or not, it would not invalidate the above arguing; which depends entirely upon the fense of Scripture, and which may be corroborated by many proofs from the natural state of the earth; and where these two concur to offer clear, express, and united evidence, there no event in nature, which may appear unaccountable to some, but may be easily accounted for by others, ought to fet aside their superior authority.

THE other article which I am to consider, is our Author's supposition (p. 135.) that only the upper surface of the earth was disturbed or destroyed at the Deluge. For 'He does not suppose with Dr. Woodward, that the whole material world was, at the time of the de-· luge, reduced into a foft pulp, but allows that every thing continued in its then state of folidity." And yet, he fays, 'it must be acknowledged, that at the time of the breaking up of the fountains of the Abyss, a great part of the materials, which were scooped out of the earth, as well as those, which then lay on the · furface of the fand and of the shore, would be loose, ' separate, and divided, and would float irregularly in that confusion of elements, which such a wonder-· ful operation must have occasioned, not only when · showered down in cataracts from on high, but also, when conveyed by the force of the waters of the sea, which gushed forth, as out of a womb, to the place destined for their abode, p. 118. So that, if I rightly understand his Lp. his opinion is, that the upper parts of the earth only were moved at the flood; and these irregularly thrown about by the waters of the deluge, in large, loose or detached, solid masses; but were not dissolved or reduced to their original atoms; much less were the strata, that lay beneath the places from whence these parts were torn: for thus he says, p. 140. (where speaking of part of a skeleton of an elephant and of feveral horns of the moofe-deer, that were found fossil in Ireland) 'It likewise hence appears, that some of the low grounds in Ireland have not been covered more than from five or ten feet thick with the · Slutch of the deluge;—fince it is not probable that at the time of the death of the afore-mentioned elephant and moofe-deer, the places upon which they were found lying, were the natural surface of the then babitable earth; or as it is more clearly expressed,

p. 104. where we may suppose the surface of this earth was, when there were no mountains, but all this world was an uniform globe, covered with water (as at the creation) there the firata are uniform; and the feveral layers of them, whether fand, clay, mie nerals, or gravel, are disposed in an borizontal position. parallel to one another.' This last observation (which is the only proof brought for his Lordship's opinion, and is laid down upon the authority of Monfieur Buffon) is certainly false in fact; as I will venture to affirm, every one will find that will but make ten observations upon the regular strata of the earth. in ten different places; it being far more common to find the strata, which lye beneath the slutch and rubble left by the waters of the deluge, upon the furface of the earth, inclined in various directions, rather than borizontally disposed; which must undeniably prove that fuch strata have been moved or displaced, and of course, that the effects of the deluge reached below what is called by fome, the fast-ground, or what our Author imagines to have been the furface of the Earth before the flood. And I dare fay, if he will have the earth opened in the places, where the above mentioned horns of the moofe-deer, &c. were found, deeper than ten feet, he will discover as many infallible marks of the deluge, as the horns, &c. of the aforefaid animals, fuch, for inftance, as fea-shells, teeth and bones of other animals, or plants, &c. At least fuch are frequently found in England, beneath what is commonly called Slutch; and I suppose Ireland was not more favoured during the deluge than England. In short, what is called Slutch, is no more, (as I observed before) than that matter, which the waters in their retreat from the earth at the end of the deluge, left on places fit to receive it, as the flats on the fides of mountains, the bottoms of dales, vallies, &c. as

the substance of which this matter consists, and the manner in which it lies, evidently prove; it being generally of a mixed nature, confifting of various fubstances,-and lying, not in regular strata, as stone, chalk, &c. do, but in small seams or streaks, of unequal breadth in different parts, and in a train, just as the last sediment of water would naturally leave it. So that it is no wonder his Lp. cannot be of opinion that all the metallic and mineral matter of the earth was diffolved or separated and reduced to its original atoms at the Deluge, when it does not appear from his obfervations, that he ever examined the earth below ten feet, but judged of the effects of the Deluge upon the whole body of the earth, from what was transacted only, and that very weakly, on the superficial part. But I hope to make it evident, both from scripture and nature, that all the strata of stone, coal, chalk, &c. and all the veins of ore in the antediluvian earth were actually dissolved, their constituent corpuscles separated one from another, and when in this state of separation, were mixed with a large quantity of water, so that the whole was reduced to a fluid colluvies. But of this in its due place and order.

Having premised thus much; I shall now endeavour to lay before the reader a plain, clear, and sull account of the Deluge; first, as described in Scripture; secondly, as confirmed by other historical evidence; and thirdly, as corroborated by the present natural state of the earth. And I hope to bring such proof of every material circumstance, that all, except those who will not see, shall be able to discern the manifold evidence for this wonderful transaction. And in explaining this event, I design to have particular regard to the two above-mentioned exceptionable articles of our author, not only because He has afferted them, but because many, otherwise learned and judicious writers, as Vossius, Bishop Stilling fleet, &c. and some supposed to be learned, as Dr. Burnet, Mr. Whiston, &c. have maintained the same, and his Lp. has sheltered himself under some of their names.

With regard to the Scripture account, I begin with Gen. vi. 13. And God said unto Noah, The end of all slesh is come before me: for the earth is filled with violence thro' them: and behold I will destroy them with the Earth. So that the Earth itself, as well as its inhabitants, was to be destroyed. The Earth, as we are told before, was corrupt before God; its primitive goodness and fertility had been abused and perverted by man, and instead of rendering him more dependant on and thankful to his Creator, caused him to assume independency, and even to deify the earth, the immediate producer of its fruits, and to forget God the original Author and Former of all. So that God (in

b Gen. vi. 12. And God looked upon the earth, and behold it was corrupt; for all flesh had corrupted HIS WAY upon the earth i. e. Gop's way; for their own way was corrupt enough; and they could not properly be faid to have corrupted That. Noah we find, was exempted from the general destruction, because (Gen. vi. 9.) he walked with Gop, i. e. he went in the true way, observed the precepts of true religion, or did not depart from his God, CHRIST, (who is THE WAY, John xiv. 6. and is the LIVING WAY, Heb. x. 20). B t all those who do depart, and fet up other gods, other faviours, new protectors, of what kind or fort foewer, are termed Idolaters, As postates, Imaginers, Corrupters of the way, &c. and such will be guilty of every evil work as well as thought; for as their perverted thoughts or imaginations lead the way, so bad practice will of course ensue. · Corrupting, (fays Ainsworth on the place) is in special applied to · Idolatry, and deprawing of God's true service, Exod. xxxii. 7. Deut. xxxii. 5. Judg. ii. 19. as, the people are said to do corruptly, ' 2 Chron. xxvii. 2. when they sacrificed and burnt incense in the high-· places, 2 Kings xv. 35. So Idolatry was their chief corruption here, as may also be gathered by Gen. iv. 26. fee the Annotations there."

judgment always remembering mercy) determines to destroy by a flood of waters the Earth that then was, retrench its luxuriancy, and so take away the cause of the general corruption; that thus by altering the state of the earth, he might necessitate man to a greater degree of labour, shorten the period of human life, and demonstrate to the future race of men, their real weakness and absolute dependence on Him. appears the necessity for the destruction of the whole globe. So that the opinion of those who have carried a partial flood to the greatest extent, and allowed that all mankind, except those in the ark, were destroyed; -imagining that mankind inhabited only a large part of the world; but the brute-animals, the whole; and that the deluge did not reach beyond the parts inhabited by man (for whose sake alone they suppose the flood to have been brought upon the earth) fo that the parts inhabited by beasts only, as the Continent of America, &c. were exempted from the destruction, and the animals thereon preferved alive (by which they think they get over one difficulty, viz. the replenishing the earth with animals after the flood:)—even this opinion, I fay, will not stand the test of the Scripture account; for the Deluge, we fee, was not aimed folely at the inhabitants of the earth, but included also the Earth itself. Had Man been the only intended object of destruction, there were many ways to take him off; there was the Famine, the Sword, the Pestilence. Wind, and Storm at the word or command of Gol either of these might have been employed, without unbinging the whole frame of the earth, and dissolving all the folid strata thereof. But this last method was intended, was threatned, was executed, was necessary; and therefore the Deluge UNIVERSAL.

I PROCEED with the Scripture account, ver. 14, Make thee an Ark of gopher-wood; (rooms shalt thou make in the ark) and shall pitch it within and without

with pitch. And this is the fashion which thou shalt make it of; the length of the Ark shall be three bundred cubits, the breadth of it fifty cubits, and the beight of it thirty cubits: (a window shalt thou make to the arke) and in a cubit shalt thou finish it above: (and the door of the Ark shalt thou set in the side thereof) with lower, second, and third stories shalt thou make it. And behold I, even I, do bring a flood of waters upon the earth to destroy all flesh, wherein is the breath of life, from under heaven, and every thing that is in the earth shall die. But with thee will I establish my covenant: and thou shalt come into the

I have included this fentence, together with one just before, and another almost immediately following, in parentheses, as the sense of the Context requires, and the Original fully justifies: for the word it in the next sentence, viz. in a cubit shalt thou finish it above, plainly refers to the Ark not to the Window; fince the relative it is in the feminine gender, and the word for Ark in the feminine also, but the word for Window is in the masculine; so the sentence where That is, must be taken separately from the rest, or included in a parenthesis. And the sense is, In a cubit thou shalt finish it (the Ark) above, that is, the top part of the roof of the Ark was to be made a cubit high in the middle, and sloping on each fide; on purpose I suppose that the rain and moisture, which might fall during the Deluge, should

easily slide off, without damaging the Ark.

As Commentators have been much puzzled concerning what this Window in the Ark was, and I know but one Author that has properly explained it, and fince his treatife is scarce, (viz. DICKINSONI Physica vetus & vera) I shall lay down, and endeavour to prove the certainty of his explication .-- The common opinion is, that this Window was a Hole in the upper part of the Ark about a cubit square, or a cubit in height; but how fuch a cavity as this could possibly afford light to the three flories of the ark (one of which was doubtless under water) and to all the separate partitions in those stories, and to the many passages leading to those partitions, and this during the night, at least some part of the night, as well as in the day, is altogether inconceivable: fo that this opinion, I think, cannot be true. But (2414.) the foundation on which it is built, viz. those words, In a cubit thou shalt finish it above, refer, as I have already shew'd, to the Ark, and not to the Window. So that (3414.) let the reader reArk; thou, and thy sons, and thy wife, and thy sons wives with thee. And of every living thing of all flesh, two of every sort shalt thou bring into the ark to keep them alive with thee: they shall be male and semale. Of sowls after their kind, and of cattle after their kind, of every creeping thing of the earth after bis kind: two of every sort shall come unto thee, to keep them alive. And take thou unto thee of all food that is eaten, and thou shalt gather it to thee; and it shall be food for thee and for them. Thus did Noah; according to all that God commanded him so did he.

WHAT Forefight and Wisdom were here requisite! I have already proved that the Deluge was a supernatural

member, there is no precise outward form ascribed to this Window. And (4thly.) what is translated, A window thou shalt make TO THE ARK, if, render'd according to the Original, is, for, or for the use of the ark, LaTaBE; so that a window in the common acceptation of the word, can scarcely be the meaning of the inspired writer. - 5thly. The word JER (translated window) properly denotes a clear light, and as I ER fignifying oil, comes from the fame root, and both are derived from a verb, fignifying to shine bright, so the command here. given to Noah, in all probability was, to make a clear shining sub-Stance, or a bright oleagenous matter, for the use of the Ark. Now fuch would certainly be of great fervice by affording light to every separate room fince it might be hung up in mall weffels, or otherwife, as the circumstances of time and place required: This substance too might be of such a falutiferous nature, or fend forth such vivifying rays, as would greatly conduce to the bealth of the animals in the Ark. That it is possible to make such a self shining matter, either liquid or solid, the hermetical Phospher of Balduinus, the aerial and glacial NoElilucas of Mr Boyle, and the Pantarba of Jarchus, (which last 'shone in the day, as fire, and at night emitted a flame or light, as bright as day, tho' not altogether fo ftrong') and many other preparations of the like fort fufficiently evince (fee Stackbouse's History of the Bible. Vol I. p. 130); and that it might have been, or that many have been, of the above supposed salutiferous nature, Widenfield in his second Book de Medicamentis has plainly shew'd. And by the command here given to Noah, without any particular directions about preparing this fubstance, we may fairly collect, that he well knew of aubat, and in aubat manner, to make it .- 6thly. The Jewish Rabbies feem to have had

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ledge, no natural experience, no deduction from causes or effects, could possibly have given mankind the least notice of such an event: of course a revelation (as Moses informs us) must have been made to Noah, in order that he might foresee and be provided against such a transaction. And not only a revelation of the Fact, but the Means also declared, by which he might avoid the consequences of it, and have time to take due care for the preservation of himself and family, and for replenishing the earth with a stock of its former inhabitants. As he was told that the whole earth was to be

fome notion of the true meaning of the word under consideration, by supposing that it denoted a large bright Carbuncle, or precious flone, which Noah hung up in the middle of the Ark, to give light all around; but this certainly would not wholly answer the end, for fuch a stone (supposing there was such) could not emit light into every separate partition, and all the passages leading to the partitions, &c; fo that some such shining substance, as the above, which might be carried in the hand from place to place, or hung up, or &c. was certainly necessary and intended .- 7thly. The Chaldee Paraphrase renders the word for window by one fignifying sumply light .- 8thly. The Septuagint Translators (probably not knowing any word in the Greek that would answer to the Hebrew JER) have omitted or else have substituted a verb (smoovaswi) for it, which conveys neither the idea of light nor window; and this certainly they would not have done, had they thought the word meant a common window. -9thly. But what adds great confirmation to the above exposition is, that the common word for window [viz. HaLUN, which is derived from a verb fignifying to bore or cut thro', and properly denotes a Hole or Window in a building is not used in this place; and yet it is used in the account of the ark, Gen. vii. 6. where Noah is said to have opened the Window of the ark and let out a raven. Here a Window, as generally understood, is certainly meant, and the common and proper word [HaLUN, not JER] is used; which evidently shews that some other interpretation than that of Window, must be attributed to the word [ER; and fince the fignification I have above contended for is so remarkably corroborated by such a number of circumstances, we may, I presume, justly conclude it to be the true.

destroyed by a flood of water, so the most he could preconceive concerning the impending danger (allowing he could conjecture thus much, which, unless Shipping had been in use before the flood, he probably could not) was, that a vessel of wood would be the most likely means of saving him, and all that was necessary to be secured: but of what size or form to make this vessel, that it might suitably contain the things that were to be taken in, and answer in all other respects, no human wisdom, I believe, could possibly adjust. Had man been left to himself to form a vessel that should conveniently hold a certain number of all the various species of birds, beasts, and creeping things in the earth, and contain also proper and sufficient food for them for the space of a whole year, (for so long the Deluge lafted) he probably would have made the veffel unneceffarily big, even fo large as to endanger it's fafety: and this is pretty certain, from the objections which those who have laid claim to the greatest share of buman Reason (viz. our wise free or rather no-thinkers) have made to the Mosaic account, supposing the Ark therein described to have been of too narrow dimensions. But the wisdom of man is foolishness with God, and every objection to Scripture proves nothing but the folly of the objector, which in this case is abundantly manifest; for after the strictest examination and most accurate furvey, it has been proved by feveral learned persons, that the size of the Ark, as given by Moses, was exactly correspondent to the things that were to be taken in. d And tho' Moses could not but foresee, that fuch objections as these would be raised against

d See Buteo de Arca Noe; cujus formæ & capacitatis fuerat Sir Walter Raleigh's History of the World, Book I. Chap. 7. 99. That the Ark was of sufficient capacity. Bishop Wilkin's Estay towards a real character and a philosophical language. Part II. Chap. v. 9. 6.

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his account, yet he left it to stand the test, barely relating the fact, not anxiously explaining the reason of every thing; well knowing that he was directed in what he faid by Infinite Wisdom, who would order all things in measure, and number, and weight; and quite satisfied that if man would but act the proper part and use his Reason aright, that is, not judge till he had well weighed and confidered the subject, the justness and propriety of what he related would eminently appear. [Hence, by the way, we may fee the great necessity. of much natural knowledge in order to apprehend the philosophical parts of the Bible, and that Moses did not fuit his descriptions of things to the capacities of the vulgar, but wrote for the most improved Understandings. - Again; as it was necessary that two at least of each species of animals of the land and air, and these a male and female (for future propagation) should be taken into the Ark, so it was impossible that Noah and his family of themselves could have collected them together; many of the creeping kind are so small as to escape the human sight, unassisted by the best Glasses, and probably many there are that cannot be discerned even by the help of them, at least so far as to discover which are male and which female; others are of so swift a flight, or of fo wild and rapacious a nature that they cannot be caught and tamed by man: Gop therefore must have directed the several kinds in suitable numbers to the Ark (probably in the manner he influenced them to come to Adam, when they were first named. Gen. ii. 19.) Agreeably to this Moses informs us that the fame divine Person who forewarned Noah of the flood, affured him, that two [or rather as the word may be render'd couples; for more than two of fome species were taken in] of every fort should come unto bim were necessary to be known, all these preparations necessary to be made by those who could possibly be faved, and answer the end of their falvation (by being able to replenish the Earth with a stock of its former inhabitants) in fuch a Flood as was That in the time of Noah. But these articles could not be known, nor could these preparations be made without divine affistance; such affistance therefore was undeniably given to Noah; and it is equally undeniable, that all those who had it not, perished. Hence our Saviour represents the Flood as coming upon the ungodly quite unexpectedly, Matt. xxiv. 38. In the days that were before the flood, they were eating and drinking, marrying and giving in marriage, until the day that Noah entered into the ark, and KNEW NOT until the flood came and took them ALL away. Surely then none either did, or could escape; for, if even a few had reached the highest mountains, yet as they had had no time to prepare themselves with food and the common necessaries of life, they must soon have perished thro' hunger.

AGAIN; had not the Deluge been universal, but partial only, and extended even over one half of the globe, there certainly had been no need of the Ark. Noab and his family might have retired from the destruction, in the same manner as Lot and his family did from that of Sodom and the countries adjacent, into some other part of the earth; and this might have been done in much less time and with far less care and trouble, than to have built fo large a vessel as the Ark was, and prepared all the necessary things for the fafety of the animals that were to be included. least had the Deluge been partial, there had been no occasion of taking in animals of every kind, male and female of every fort to keep feed alive upon the face of all the earth; (Gen. vii. 3.) for had any islands or countries with the creatures peculiar thereunto, been exempted from the common calamity (as our Author supposes) it had been needless to have preserved such by means of the Ark; or indeed to have taken in any of the

Brute-creation at all, fince they might have been conducted to those parts of the earth which the Deluge reached not, by the same means that they were brought to the ark to be saved thereby; many of the beasts such as are of the swift and wild kind, might easily have escaped thither; and the birds without difficulty, might have fled, from the approaching danger, into the most distant regions of the earth. But as all this precaution was taken, all these measures executed, it is certain that God intended that the Deluge should be universal; and we shall see hereafter from the effects of it, that it really was so.

For, as foon as Noab and the animals were entered

into the ark, we are told, that

All the Fountains of the Great Deep were broken up.

THE Maker of this earth (who certainly knows its inward as well as outward structure) has inform'd us. that there is a vast collection of waters within it, characterifed (to diftinguish it from all leffer Deeps, Seas, &c.) under the name of the GREAT DEEP: it is called Gen. xlix. 25. The Deep that lieth under. i. e. the earth; and Deut. xxxiii. 13. The Deep that coucheth beneath: and in the second commandment is included under the term of the Water under the earth. From this refervoir all fountains and rivers receive their fupplies, as the wifest of natural Philosophers has told us, Eccles. i. 7. All the rivers run into the Sea [the general collection of waters, part high up, and part beneath, the earth] yet the Sea is not full [doth not reach the height of, or run over, its shores]. Unto the place from whence the rivers came, thither they return The shell of the earth is represented as lying directly over this abyss, or covering it as an

^{*} This collection of waters I have designated by G. H. in the sub-fequent Plate, which the reader will consult, and also what is said in Note k.

Arch Aretched over an orb of water, so the Psalmist, xxiv. 1. The earth is the LORD's; -for be bath FOUNDED it upon the seas, and established it upon the FLOODS; and again, cxxxvi. O give thanks to the LORD of Lords, who alone doth great wonders; -to Him (for this is a wonderful and very beneficial act) that STRETCHED OUT the earth above the waters: So of the first sediment, strata, and laying the foundations of the earth, Prov. viii. 27. When he prepared the heavens, I was there; when he set a Circle upon the face of the Depth; when he appointed the foundations of the earth. And Job xxxviii. 4. Where wast thou when I laid the foundations of the earth? Whereupon are the sockets thereof fastened? Or who had laid the Corner-stone [the key-stone of the arch] thereof? And ch. xxvi. 10. He fet a Circle upon the face of the waters. So that the shell of the earth is of a circular form, comprehending (as the shell of an Egg contains the Fluid within) an orb of water, according to the deleniation in the Plate, where F. denotes the crust of the earth, and G. H. the fluid within. Thus were things fituated before the Flood, and thus indeed are they at present.

But before I can shew what the alterations were that were made in the terraqueous Globe at the time of the Deluge,—what Agents were employed,—and the Manner of their acting,—it will be proper to say something of the original formation of the earth.

The first Agent that is mentioned to have had any effect towards reducing the formless mass of the earth into shape, is the Spirit, Gen. i. 2. And the Spirit of God moved upon the face of the waters. What this Spirit is may be judged of from similar passages in Scripture. The word rendered Spirit [RUE] is the same as is usually translated Wind, and denotes Air in motion, as Isa. xl. 7. The grass withereth, the slower sadeth; because the Spirit of the LORD BLOWETH upon

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it: here certainly the natural motion of the wind is meant; as also it is in the following passage, Psalm exlvii. 16. He giveth snow like wool; scattereth the boar-frost like ashes. He casteth forth his ice like morsels; who can stand before his cold? He sendeth out his Word [fymbolically placed for the Light of the Sun; as his real Son is the Light of the World, and the Word of life and melteth them: be causeth his Wind [RUF, bis Spirit) to blow, and the waters flow. So also, 70b xxxvii. 21. And now men see not the bright light which is in the clouds [more properly it means, in the skies]: but the Wind [the Spirit] passeth away and cleanseth them; i. e. by the motion of the air the sky is cleared, and the light rendered visible. So again, ch. xxxvi. 16. By his Spirit be bath garnished the Heavens. But what more evidently confirms the above interpretation is, that at the time of the Deluge when the Earth was totally diffolved, and all things in the same confused state they were at the beginning of its first formation, the same Agent is mentioned to have been employed towards the reforming of it, viz. Gen. viii. 1. And Gop made a Wind [Rue, the Spirit] to pass over the earth and the waters asswaged. Here certainly a motion in the air is meant, and as certainly it is to be understood in the former case when we are told, that the spirit of God moved upon the face of the waters; i. e. God by his immediate power caused a motion or raised an agitation in the (before) dark, stagnant Air around the earth, (and it is called His Spirit, because he alone did, or indeed could, produce fuch a motion) which MeReHPet, MOVED; this word in the original, as his Lp. of Clogher observes (who also allows that the Spirit here spoken of is the Air's signifies properly 'a

See his Vindication of the histories of the old and new Testament, Part II. p. 47. Many antient writers have thus interpreted it, as

· shivering or tremulous kind of motion, such a man ' maketh, when he shaketh for fear; in which sense the word is used Jer. xxiii. g. or as a hen [Deut. 'xxxii. 11. an eagle] uleth when she expandeth her body and wings [fluttereth] over her brood of chickens [ber young ones]. And therefore this word * is elegantly expressive of the vibrating motion of the · Air.' This action of the air, we are told, was upon the face of the waters, i. e. upon the surface of the fluid turbid mass of the earth, and therefore would have fuitable effects upon it, i.e. by furrounding and compressing the outside, would determine the earth to be of a spherical or orbicular shape, as the action of the Air upon any fluid body, suspended in it, at present determines it to be. But the gross action of the spirit alone could not enter much beyond the furface, or cause any great alteration in the Inside; some other therefore more fubtle, penetrating Agent than this, was requisite to form the shell of the earth or drive together the folid atoms thereof. Accordingly the next thing we read of was the Production of Light.

Philo Judaus, Martin de Borhai, Joannes Mariana, and two or three of the Fathers were of this opinion, as his Lp. observes. And even Hobbes (whose opinion may please some persons better than any one's else) argues thus, (Leviat. p. 208.) Gen. i 2. The Spirit of God · moved upon the face of the waters. Here if by the Spirit of God · be meant God himself, then is motion attributed to God, and con-· fequently place, which are intelligible only of bodies, and not of · fubstances incorporeal; and so the place is above our understanding. that can conceive nothing moved that changes not place, or that has * not dimension; and whatsoever has dimension is body. But the " meaning of those words is best understood by the like places, Gen. viii Where when the earth was covered with waters, as in the · beginning, God intending to abate them, and again to discover the dry land, ufeth the like words, I will bring my Spirit upon the earth. and the waters shall be diminished: In which place by Spirit is understood a wind, (that is, an air or spirit moved) which might be · called (as in the former place) the Spirit of Goo, because it was « Gop's work.

And God said [decreed, commanded] Let there be

Light; and there was Light.

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HERE an Agent is introduced, the most subtle as well as most powerful of any in nature. We all know, that Light passes freely thro' the hardest and closest of terrestrial substances, and when its atoms are collected in a focus, will separate and dissolve the parts of the most compact body. Here then are two very powerful Agents; one that displays itself principally by pressure, the other by penetration. And what might not fuch Agents as these do, in the hand of the mighty Creator? No Command in Nature could be insuperable to such servants, under the direction of fuch a Master. We need not therefore wonder, if we should hear of great and mighty events brought about by these Agents in ever so short a space of time, nay, if the earth, from a formless, fluid. confused mass, should be made, within the space of a day or two, into a solid babitable Globe. To effect which, these Agents are put in commission by the following Command.

And God said, Let there be a Firmament [Marg. Expansion] in the MIDST of the WATERS [the fluid, chaotic mass of the Earth, called Waters before, ver. 2.] and let it [there] divide the waters from the waters. The reader then will remember that this whole transaction was to be upon or in the Earth, not in the midst of the heavens or in the Air at a vast distance from the Earth, as many Commentators have imagined, but the whole transaction was to be in the midst of the waters of the Earth. And the words plainly imply, as others in this chapter do, a Command to natural Agents to operate. Light had been formed, had reached and acted upon this Globe: and wherever Light and Spirit [or Air in motion] are, there would of course be a struggle between them, and this struggle would pre-

duce an Expansion, this expansion a division, and so on. The word for Firmament, RaQ10, explains what the Firmament is; the word fignifies, as we fee in the margin of our bibles, Expansion, and the meaning is, Let the Light and Spirit expand and diffuse themselves, and let them press into the mixture, called Waters; and let them act in, among, or between the parts of it, and drive the folid parts together, and thereby make a feparation, and with the parts feparated a division or wall between the waters; so that one moiety of the waters shall lie on one side of this wall, and the other on the other fide. To explain how this was done. The Earth, we are told, was created void, (Gen. i. 2.) i. e. bollow, empty within (as the word means Isa. xlv. 18.) or with a large central Hollow (called, Job xxxviii. 8. the womb of the earth) filled only with air, as every bollow place in the earth at present is filled. As soon therefore as the light had reached this central or inward air, there would instantly commence a conflict between them, or a struggling this way and that as from a center; which is obvious to every ordinary capacity in the case of a bladder that is flaccid or half-filled with air, when held before the fire. The light, (which not even the closest-compacted substance can deny a passage to) iffues forth from the fire, and penetrates the pores of the bladder, drives itself in amongst the gross air, which must force That to push itself every way outward, and diftend the fides of the bladder that encloses it. Thus would the inward Expanse or expanding-air act upwards every way from the center to the circumference of the Chaotic mixture; while the outward Expanse or the light and spirit on the outside of this globe would act downwards on and through every part of it. And by these two equal and counter-acting agents the earthy or solid parts of

the chaotic mass would be driven together into a spherical shell at a considerable distance from the center of the earth, and there be fustained; and as the earthy or folid parts would be driven together into a close hard shell or crust, so by the same action would the fluids be permitted to flip between on each fide of this crust. Thus would the shell of stone or the Earth be formed between two orbs of water; one orb would cover the outward furface; the other would cover, or by the force of the expanding air from the center, be pressed close to, the inward surface of the earth. Such being the situation of things, it will now be apparent to every one how the earth was founded upon and formed between the waters .- And as the shell or crust of the earth was driven together by the expansive power of the air, and formed between two orbs of water, so the Firmament acted the part it was commanded of dividing the waters from the waters.

And as the Expansion had this power from the Creator (for He first caused the motion in the, before, dark stagnant air; that motion produced Light; that Light and that Spirit an Expansion, &c.) and as it was now immediately under the influence of its Maker, and acted according to his Directions; so (and to prevent the Israelites from imagining it to be a God, and not the work of God, as the idolatrous nations did)

Moses adds,

And God MADE the Firmament; and divided the Waters which were under the Firmament, from the Waters

which were above the Firmament.

This is a further description of things, in order to prevent our mistaking where the Waters divided, and where the Airs dividing, were; and to prepare the reader for what was to follow. The Expanse, as we have seen, acted from above and from below, and by forming the crust of the earth in the midst of the

waters, separated the waters from the waters; which waters, thus separated, would be in two distinct orbs; one covering the outward furface of the earth, which therefore would justly be designated by the waters under the open Air, Heaven, Firmament, or Expanfion; in the same sense as the bills (Gen. vii. 19.) are faid to be under the heaven; and as these waters then covered the whole furface of the earth, they were more immediately under the beaven. And as we have feen already, there was a body of expanding air at and round the center of the earth, fo the waters that were directly above this inward Expansion, i. e. those which were close to the concave surface of the earth, would properly be denominated Waters above Air, Firmament, or Expansion. That there was really a body of expanding air at and round the center of the earth (on which supposition the above interpretation depends; and ignorance of this has produced all the difficulty which this part of Scripture has been thought to labour under) is evident, not only from its being afferted that the earth was created comparatively bollow, or filled only with air; but from the text under confideration: For (1st.) here is express mention made of two Expanses, and the opera-

And thus the shell of the Earth F. will be formed between two orbs

of water, by the action of the two Expanses.

The reader may have an idea how things were fituated at this time from the PLATE annexed (tho' not principally defigned for this purpose) by a little mental alteration. Let D. denote the outward Expanse, surrounding, compressing and penetrating the mass of the Earth. Let the vacant Space, E. (encompassing the Earth) be supposed to be filled with the water H. as it was at this time, and then this water will fignify the waters under the [outward] Fi mament or Expanse. Let the Spaces designated by H. and I. be filled with the Air or Expanse E, and then this will denote the inward Expanse, acting upwards; and the orb of water G. will stand for the waters above the [inward] Firmament or Expanse.

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tion of each, as I have shewed already, was on or in this earth. It is allowed by all, that one Expanse acted on the outward or convex furface of the globe; the other therefore must be within, and act on the inward or concave furface. But (2dly.) had there not been an Expansion from within, or from below, as well as from above, there could have been no separation of waters from the waters, or the shell of the earth could not have been formed between the waters; for had the outward Expanse acted only, it would have driven the folid parts of the terraqueous mass quite down to the center, in the fame manner as it now precipitates mud or any earthy folid fubstances through the waters of the fea; and in this cafe the earth would have been formed as a folid ball, or kernel, at the center; and all the water would have lain over it in one united mass, in the same manner as the at-But there was mosphere at present covers the earth. a Separation of waters from the waters, by the intervening shell of the earth, formed by the expansive power of the Air; and therefore there was an inward Expansion as well as an outward.——And as there was an orb of water, separated from the terraqueous mass, by this inward Expansion, so it could be no otherwise distinguished than by being called (as it is) Waters above the Firmament, or Expansion.—But then a question may be asked, How should this inward orb of water be fultained, or kept close to the inward or concave furface of the earth, and so be prevented from falling down to the center?—I answer, by the same means that the outward orb of water was kept close to the outward or convex furface of the earth, or as the fea is at present prevented from falling down through the clouds (especially at our antipodes, to speak as the vulgar would most naturally think) or from returning again to cover the earth (though the earth be revolv-

ed so immensely swift on its axis)-all which is effected by the compressure of the Expansion, or the Air acting on the outward furface of it; which Agent might as well keep waters above it as under it; for there is no fuch thing as innate gravity, or natural tendencies of bodies to centers, &c. All matter, as our modern philosophers allow, is dead, innert, inactive, quite indifferent to every kind of motion; and therefore cannot possibly move unless impelled; and which way foever it is impelled, either upwards, downwards, or sideways, thither it must move. Sir Isaac Newton in several parts of his writings speaks of Gravity as being no more than Impulse, and attributes the Cause of it to an atherial medium, or subtile fluid "; which way foever therefore fuch a fluid impels, that way must motion be. And with regard to up and down, or above and below, every child in philosophy knows that they are only relative terms, respecting our fituation upon the earth. No fuch difference can properly be applied to the inanimate agents; which must of course act uniformly the same, up or down, just as they are placed, and have room to exert their power: And as at this time they were differently situated from what they are now;—there being a body of expanding-air at the center, as well as one upon the circumference of the earth, so each would produce the same effect on the side it acted against, i. e. separate and support an orb of water.

THE Earth being thus totally covered with water, the next requisite step would be to free its surface of

this fluid, and permit the dry land to appear.

Hence we read the next Command of God was,

—And God said, Let the water under the Heaven be
gathered together unto one place [or be united], and let
the dry-land appear. The waters were before in two

^{*} Princ. Mat. 3d. Edit. p. 147, 188, 488, Optics p. 323 .- 29.

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places; one orb, covering the outward furface of the earth; the other, inclosed within its inward surface. The former of these must be gathered to the latter, that is, the waters that were under the beaven or open air (viz. those which were upon the outward surface of the earth, and which prevented the appearance of the dry-ground) were to be gathered together to those beneath the earth, which was the only place where there were other waters. The manner how this was effected by the Agents then in Commission may easily be conceived. As the matter of the heavens would be more and more melted down by the intense fire at the focus of the primæval light, so would the strength of the Expansion be increased, in proportion to the quantity of matter melted, and the degree of agitation; and how great its force must have been on this the third day, may be partly gathered from the extent of its fphere on the fourth, which reached by that time the other orbs, and even the fixed stars, as is evident from ver. 17. The Light and Spirit having fuch an immense sphere of action, and acting very powerfully near the earth (as is certain from the quick growth of vegetables, &c. on this, the third day) would press strongly upon the outward surface of it; and by the continual and new admission of light, through the shell to the central air, the inward expansion would be vastly heightened and increased (in the manner described p. 30.) and by this means would be made to act more forcibly against the inward or concave surface of the earth. This force continuing to act with increased vigour, would foon crack, cleave, and break the shell of the earth in many places, and fo make room for the waters that covered the outward furface to descend, or be pressed down through these cracks; and as the inward air went out, the outward orb of waters would rush in, and supply its place; and so be mixed or united with the waters that were beneath the earth.

And thus by the waters under the heaven [viz. those that once filled the Space E] being gathered together to those that were beneath the earth, [viz. H. where was the one place appointed for them all, and when united in this one place they would constitute the Great Abys, G. H.] the dry-land would of course appear, and the Command be effected. And God called the dry-land [that which was at first immersed in the waters, but now prominent above them] Earth; and the Gathering together [the whole collection] of the waters, called be [under the general Name of] Seas. And thus would the Earth be formed, much of the same shape it is at present, and as the Plate annexed represents it.

From the description here given how the Earth was at first formed, we may obtain an easy solution of the several seeming difficulties relating to the Deluge. For, first, we have here discovered where a body of water lies, (viz. G. H. the great Abyss) sufficient to flood the Earth to an immense height, for but part of this water (viz. the orb G.) once covered its whole furface. And we have also discovered two very powerful Agents, one [viz. the Spirit or Air in a violent motion | capable of performing the grandest transactions by pressure; the other [viz. the Light] capable of displaying immense power by penetration. We have feen that these two Agents (under God) separated the Solids from the Fluids of this globe, drove them together into a hard circular shell, and permited the fluids to flip on each fide; and by renewed vigour and redoubled power, cleaved, cracked, and broke this shell in various places and so opened a way for the water that covered the outward furface of it to defcend, part into the infide, and part to occupy the large cavities it had made in the shell, and so constitute feas, lakes, and by this means so diversify the furface of this globe, with land and water, as to render it a commodious and a pleasant situation for its future inhabitants.

But as these inhabitants, about 1600 years after the formation of this beautiful seat, had greatly abused the goodness of the maker, forgot the original Author of it, and deisied the Creature, instead of the Creator; God determined, by inverting the order of Nature, to destroy them, and demonstrate his power over the natural Agents to the future race of men, by bringing a flood of waters over the face of the whole earth, and so making the air descend into the place of the water, and the water ascend into and occupy the place of the air, and by this means destroy that wicked generation in the most dreadful manner.

Accordingly God publishes his Declaration, Gen. vi. 17. And behold I, even I, do bring [MeBIA, am the cause or instrument of bringing] a flood of waters upon the earth to destroy all sless, &c.

AND as foon as Noah and his righteous family were entered into the Ark, we are told,—The same day all

the fountains of the Great Deep were broken up.

What the Great Deep is we have feen already, and also that the orb of the Earth surrounds it as a shell; and moreover have seen, that this shell was at first formed whole and entire by the expansive power of the Air or Firmament, and by an increased strength or redoubled force of that Power was cracked and broken in various places, in order to permit a quantity of water that covered its outward surface to descend into the inside.

Now, an Agent that could once by the direction of its maker, do this, could do the same at any time, when that divine Author pleased. The force of the natural perpendicular Pressure of the air upon the earth is known to be very great; and its lateral

^{*} The Weight of Air on every superficial Square Foot is above " 2000 Pound Weight."—And "fince the Number of Square Miles on

or horizontal pressure, as in case of high winds and tempefts, will rent the rocks, and elevate the waters of the Ocean to a prodigious height. So that the Power of this Agent being preternaturally increased, and its force exerted upon the water of the Ocean and of course upon that of the Abyts (which is connected with it and lies immediately under it) would caufe those waters to issue from their (before) confined station, burst open their common outlets or the passages for springs, fountains, &c. and flood the earth in proportion to the quantity of water emitted. The Consequence of such an extraordinary Pressure of the Air may be judged of from the Effetts which a fimilar pressure of this Agent had upon the waters of the Red Sea, recorded Exed. xiv. 21, 22. xv. 8. When a frong Wind [RUE, a violent Spirit or Agitation in the Air drove back the waters of that Sea, caused the floods thereof to stand upright as an heap, and were a wall to the Children of Israel on the right band and on the left as they passed through. a Continuation of such a Force as this upon the waters of the Sea and those of the Abyss would certainly break open the fountains of the Alogs, and raife the water above the Tops of the highest mountains or to any height whatever. To one of the above acts the Psalmift alludes when he fays, (Psal. xviii. 15.) Then the springs of water were seen, and the foundations of the round world were discovered at thy chiding, O LORD, at the blasting of the breath of thy displeasure. The effects also of a strong Wind or a violent agitation

of the Spirit are described I Kings xix. II. When Hatab had an exhibition of fome grand display of the Power of Gop, And behold the LORD passed by, and a great and strong Wind rent the mountains and brake in pieces the rocks before the LORD; and after the Wind [as a consequence of this violent agitation of the air an Earthquake: And fuch certainly there was at the Difruption of the shell of the earth in the time of the deluge. A very terrible event this (fays a certain Author) no less than the shell of stone broken up in many places, and shattered in all the rest; all the Inlets, Under-Seas, Lakes, &c. made Fountains; and all the strata which formed their sides, and the sides of the old Springs, thrown up unto the furface; spouts of vapours to darken the sky, and vast spours of water rifing like fountains, making a dreadful noise; rifing in the fea, and running to the fea, and the fea rising and driving the people, &c. to the mountain tops, their last shift; where they with fright, rain, or hunger, perish'd; or those who survived 'till the waters came were destroyed by them. And thus also the beginning, process, and completion of the deluge are described in the book of Job, ch. xxxviii. 8. Who poured out (fays Gop) the fea thro' doors, when it brake forth, as if it had iffued out of the womb? When I made the Cloud [gross air] the garment thereof, and thick darkness [condensed, stagnant air] a swaddling-band for it (this must have been at the time when the flood was at the highest, when the inward Air or Firmament (or the air which had preffed upon and at last broke its way thro' the shell of the earth) had driven out great part of the water of the abyss, occupied its place, and supported the remaining part of the water against the inward or concave furface of the earth; and when the outward Air or Firmament, furrounded and compressed the upper orb of water, close to the outward surface of

^{1 70&#}x27; from 703 fudit, effudit, perfudit liquore aliquo. MAR. CAL.

the earth]. And then I brake up for it my decreed place, [i.e. the shell of the earth which I had formed and established between the waters; and by breaking this, permitted the upper waters to go to their appointed place; and when once retired thither] I set bars and doors, and said, Hitherto shalt thou come, but no surther; and here shall thy proud waves be stayed.

But what is more than all this, an effect greater than the difruption of the fountains of the Abys, is That

which follows,

And the windows of beaven were opened.

Mr. HUTCHINSON is the only Author I know of, who has properly explained these words. I shall therefore give the reader his explication; Moses's Principia, p. 70. 'The windows of heaven have been taken for ' imaginary falls of water from above the beavens, from ' the clouds, from the air turning into water, &c. 'Synop. Crit. Tom. 1. p. 97. 'Cataracta cali, &c. "i. e. The Cataracts of beaven,—the windows, boles, " openings or cataracts of HEAVEN, i. e. of the AIR, " as Gen. i. 7. Isai. xxiv. 18.' Crit. Sacri, Tom. 1. ' p. 147. 'Nam Cataratta teste Hieronimo, &c. i. e. For " a Catarast, according to St. Jerom, is a bole in a " wall, such as smoak gets through. Isai. 1x. 8. as " doves אל ארבתידום (by Sym.) to their doors [fupidas] "to their windows. Isai. xxiv. 18. The windows of " beaven were opened; -li. 6. The heavens shall vanish " like smoak." 'Tis plain, Cataratta fignify windows, ' holes, fluices, or flood-gates, or cracks or chinks in ' walls or buildings, fuch as smoak passes through out of one house into another, or windows such as ' pigeons go in at, or cracks or holes in the walls of ' great buildings or rocks, fuch as pigeons creep into ' and harbour in. This word is most clearly compared, ' and is the very same they say it is. The Airs, and the Abis of waters, are each called Gop's Storebouse; ' and the wall between them is the sphere of the earthor

· Shell of the Strata of Stone, in which there are innumerable

cracks, through which the fumes or vapours or mix-

tures with air, like smoak, continually pass at the

' same passage, sometimes up for rain, &c. and some-

' times down.' [So that the phrase windows of beaven

Mr. HUTCHINSON, in his Observations in the year 1706, (1 ft. edit. p 93.) remarks, (long before, I believe, he had any thought of interpreting the passage under consideration in the manner. he has done) 'Through the cracks in the strata, the water also passes to springs .- In fair clear weather, when there is any wind sirring and motion in the Air above, the air below in mines passes so sensibly at these cracks, as sometimes to blow out a candle. But when the rains are rifing, the moisture expels the air, and causes such a ' scarcity of it, or else a want of circulation of that air, that the candles will not burn; and withal fuch a fensation of heat to men, as ' scarcity of air, in other places, does -It is plain, the air will be thus expelled out, and return alternately into these cracks, as the · Steams that supply rain, fill and quit them." The same is remarked by Dr. Woodward; and the free intercourse between the Air below and our Atmosphere or the air above, through every cranny in the earth, is fully proved; and the alterations or the rife and fall of the mercury in the Barometer are shewn to depend thereon; vid. his Nat. Hist. of the Earth illus. &c. Translator's Introduction, p. 109-153. See also Lowthorp's Abridgm. of the Phil. Trans. Vol. II. ch iii. and Gaffendi animad. in 10" librum Dioginis Laertii, Vol II. p. 1052.

I may here observe, with regard to the text under consideration, that the word ארבת (translated windows) is derived from the verb ארב which fignifies to lie in wait. to lurk privily in a den, to watch in a hole, under cover; as Psalm x. q. ארב he lieth in wait secretly as a lion in bis den. Job xxxviii. 40. The young lions abide in the covert to lie in wait. And the word ארב fignifieth a den, or bole, or cave in the rock, as Job xxxvii. 8. Then the beafts go into dens [378]. And even the Septuagint Translation of this word, rulagarlas, includes much of the meaning of the Hebrery, as xalagaxing is derived from xalacearow to iffue out, to break through; and may be rendered the place of rupture or breaking through; it also signifies a Gate, see Scap. Lexi. So that the same idea of a hole, cave. po flage, opening, &c. is preserved in all the above places, the context in each place determining the precise meaning of the word. Hence other passages, which feem to differ, may be reconciled to this explication, as z Kings vii. 2. where, on account of an extreme famine, a Nobleman for disbelieving the word of Elisha, (who had foretold that there should soon be a great plenty of flour and barley) - fays, If the Loud would make windows may here be rendered the passages of the Airs.]—'In the narrowest acceptation the passages of the Airs are through every fissure, and between every fragment of Stone, and they are so many, that most forts of Stone are divided by great cracks, into pieces of perhaps a

[openings, passages] in [not of] beaven, [and thro' them pour down flour and barley, as he had heretofore rained down manna upon the children of Ifrael, Pfalm lxxviii. 23, 24] might this thing be? - And again, Malachi iii. 10. where God, accusing the Jews for robbing bim in his tithes and offerings, promises (if they would repent) that be would rebuke the destroyer that be should not destroy the VRUITS of their ground, and says, Prove me now, - If I will not open you the windows of heaven [the passages of the Airs] and empty out a bleffing. that there shall not be room enough to receive it. Here is the very fame phrase used as in the text under consideration, and must be understood in the same sense. The Abysi is called God's store bouse; and the fruitfulness of the earth or Vigetation, depends much upon the influences thereof, or water fent from thence, as any one may be convinced by confulting the Authors just referred to, but I shall con. fine myself to Scripture. Ezekiel comparing the proud Assyrian to a flourishing Cedar in Libanus, nourished by the Subterranean quaters, fays, (xxxi. 4.) The WATERS made bim great, the DEEP fet bim up on high with new rivers [fo rivers proceed from ber, the Deep] running about his plants, and fent out ber little rivers unto ALL THE TREES OF THE PIELD: therefore his height was exalted above all the trees of the field, and his bought were multiplied, and his branches became long, BECAUSE OF THE MULTITUDE OF WATERS, when be foot forth. And the Bleffidness or Fruitfulness of a land is attributed to the Deep below as well as to the Heaven above, Deut. xxxiii. 13. Bleffed of the LORD be Joseph's Land for the precious thinks of heaven, for the dew, and for the Deep that coucheth beneath. And Gen. xlix, 27. we have express mention of the Bleffings of the Drep or Abys. So that, with-holding or closing up the passages in the earth, thro' which the waters, sleams and kindly vapours arise for moistening the Earth, and nourishing its plants, would certainly render a land dry, barren, and defolate; and on the contrary, opening these passages, and permitting the vapours to ascend, would greatly conduce to the fruitfulness or blessedness of a land. The reader by viewing the irregular black firekes in the figure of the shell of the earth, represented by F, in the subsequent plate, may have a still clearer idea what these possess of the Airs are, and how the Abys is the Storehouse from whence they are supplied.

s and the cracks opened at first, is not to be determined; but they were opened, and the fragments
distanced so wide, or in so many places, that the
Airs went down into the Abyss as fast as the Waters
came up, quantity for quantity. But the Continuance and Repetition of this force would by degrees
reduce them smaller and smaller. If we carry this
expression of the passages of the Airs being opened to
the utmost extent, the Waters, much more the Airs,
spass between the grains or sands of most forts of stone;
and perhaps it will at some time appear that the
sparts of the Airs pass between every atom of stone,
and then the words imply a Dissolution, as it
really was, though executed by degrees, as men, &c.

were destroyed.

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As there are other texts which mention the Diffolution of the Earth, it may be proper to cite them ; Psalm xlvi. 1. God is our refuge; -therefore will we not fear, though the Earth be removed [BEMIR be changed, be quite altered, as it was at the Deluge1 and the' the mountains be carried into the midst of the sea; though the waters thereof roar, and be troubled. tho' the mountains shake with the swelling thereof;— God uttered bis voice, the earth MELTED [THEMUG. flowed, diffolved to atoms 1] So Job xiv. 19. which I shall translate nearly according to Pagninus's version; that being the nearest of any other to the original; For truly the falling mountain dissolved, and the rock [the strata of stone] was removed out of its place. The waters dashed the stones to pieces; and washed away the products of the dust of the earth: and thou destroyedst the hope of man. Again; Chap. xxviii. 9. in which also I shall chiefly tollow Pagninus's version, He sent his band [the Expansion, bis Instrument or the Agent by

[!] MAR. CALAS. 3113 est Diffolutio & Diminutio.

which he worked against the Rock; he overturned the mountains by the roots; he caused the rivers to burst forth from between the rocks [or broke open the fountains of the abyss]. His eye [symbollically placed for the Light | faw [passed through or between | every minute thing [every atom; and so dissolved the whole]. (at last) bound up the waters from weeping [i. e. from pressing through the shell of the earth; as tears make their way thro' the orb of the eye; or, as its related Gen. viii. 2. be stopped the fountains of the abyss and the windows of beaven]. And brought out the Light from its biding-place [i. e. from the inward parts of the earth from between every atom, where it lay bid, and kept each atom separate from the other, and so the whole in a state of dissolution; his bringing out these parts of the light which caused the Dissolution would of course permit the Agents to act in their usual way, and so re-form the earth]. 2 Esdras. viii. O Lord, whose service is conversant in Wind and Fire; whose word is true; -whose look drieth up the depths, and indignation maketh the mountains to melt away, which the Truth witnesseth, [which the word of Gop. and present natural state of the Earth bear witness to l.

VER. 12. And the Rain [the vapours which were carried high up into the Atmosphere, and formed into rain] was upon the earth [falling and subsiding] forty days and forty nights.—And the waters increased, and have up the ark;—and the waters prevailed and increased greatly upon the earth; and the ark went upon the face of the waters. And the waters prevailed exceedingly upon the earth; and all the high hills; that were under the whole heaven, were covered; fifteen cubits upward did the waters prevail, and the

mountains were covered."

^{*} From mention being here made of Mountains, as subsisting under the waters of the deluge, some have imagined that They were not,

So that, there was no bigh Hill or Mountain upon any part of the earth which was before covered with air, but what was now covered with water; of course But an irrefragable arthe Deluge was universal. gument may be drawn from these words against a partial Flood, or an universal one effected by partial means, if I may fo fay, that is, by the waters first washing over one part of the earth, and then the same water proceeding on and overflowing another, and fo fuccessively, 'till in the end the whole was drowned. For, according to Scripture, the water rose gradually and equally, and at last covered all the bigh bills and mountains at one and the same time, so that the Flood could not have been of the above-mentioned wandering nature, as some, for want of knowing where a fufficient quantity of water lay for flooding the whole earth, have falfly imagined. Besides, it is altogether impossible to conceive, that the waters could have risen to the height of any bigb bill under heaven. and not at the same time to have been of equal beight over the whole earth; for the parts of water are diffufive, having no tie or connection with each other; fo that as they mounted upwards they would spread and extend themselves equally on all sides; and at the same time that they covered one high hill, they would of course cover all others of equal height over the whole face of the earth. For we are not to imagine

and of course that the whole earth was not, dissolved during the slood. But such seem not to consider that the Dissolveson (as observed above) was executed by degrees, as men, &c. were destroyed. It is said indeed that on the day that Noah entered into the ark ALL the fountains of the Great Deep were broken up, but it is not said, that ALL the windows of heaven or all the passages of the airs were opened on that day, and it does not appear that they were all opened or the earth totally dissolved 'till the third and last prevalence of the waters, or the event mentioned ver. 24, was effected; as the comment on that verse will shew.

without a miracle of a most astonishing kind (which in this case is not to be admitted, because not mentioned) that 'a huge mass of water could have hung about any particular part of the earth, as if congealed: or flood upon the middle of it like one great drop. or a trembling jelly, and all the places about it dry and untouched, as an author observes; and then that this faid mountain of water should be removed, or rolled to another place, and fo on, 'till at length it had covered the whole earth. This shift to avoid one real miracle, is only multiplying a number of others that never were effected; and I may just add here the observation of a judicious Divine, that no ' man departed from the common faith upon pretence of avoiding any absurdity therein supposed, but that he ran himself upon the necessity of believing greater 'abfurdities than any he pretended to avoid.'

What is related above,—that the waters prevailed fifteen cubits upwards, and (or according to the translation of Jun. and Tremel. after) the mountains were covered,—does not feem to be spoken to determine the precise height of the waters, but only to denote that all living creatures must have perished in such a flood;

For it immediately follows,

And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the Earth, and every man;—Noah only remained alive, and they that were with him in the ark.

VER. 24. And the waters prevailed upon the earth an

bundred and fifty days.

As this is mentioned after the mountains are faid to bave been covered fifteen cubits (which was only related to denote the means by which all flesh perished) we may reasonably suppose, that the waters prevailed anew or continued to prevail for some time at least after the

mountains were covered fifteen cubits; especially if we consider that there is no mention yet made of the fountains of the Abyss or the passages of the Airs being closed; so that the waters were still pressed upwards, and reached in their real altitude far above fifteen cubits higher than the mountains; as many appearances in

and on the earth undeniably evince.

It may be proper to remark here, that the word rendered prevail, fignifieth fomewhat more than the bare increase or augmentation of the waters, (tho' that idea is also included) for a diffinct, and very proper word for the increase of the waters is used ver. 17 and 18, and the waters increased [IReBU, were multiplied]. And the word which we render prevail. very justly has that meaning; it denotes power, frength to prevail, get the better of, to subdue; so that by the waters prevailing upon the earth may be meant (especially as this prevalence is mentioned three times, ver. 18, 19, and 24) the total Subduing or Diffolution of the earth by the waters: Moses by this expression giving us to understand, that the waters had afted upon the earth in such a manner and effected it to such a degree. as to have reduced it, like itself, to a fluid, loose state; at least, this must have been the consequence of such a prevalence of the waters; for, as the Passages of the airs are faid to have been opened and the fountains of the Great Deep broken up, BEFORE this Prevailing of the waters, it could not but be, that the waters, as they rose upwards from the Abyss, would make their way thro' these Passages, and by continuing and repeating this action, would separate and widen the pores of the earth, and at last reduce it to its original principles or unformed, fluid, chaotic condition, mentioned Gen. i. 2. So that the Earth must now have been totally diffolved in the water.

Vengeance having been thus executed upon the wicked, a polluted earth destroyed, and cleansed by water; the next procedure would be to form it again. Accordingly we are told ch. viii. 1. that God (who delights not in seeing things in disorder, but pities when he distresses) remembered Noah, and every living thing, and all the cattle that were with him in the ark.

And God made a Wind [RUE, the Spirit] to pass

over the earth, and the waters asswaged.

THE same word that is here rendered Wind is tranflated Spirit in the account of the first Formation of things, (as I have already observed) Gen. i. 2. And the Spirit of God moved upon the face of the waters. And as the motion then raised in the air by the immediate power of God, was the primum mobile or chief Cause of bringing the Earth out of its chaotic state into its intended beautiful form, so the same Agent is here employed in order to re-form the earth after its destruction or dissolution during the deluge: and of course the same effects followed.— Waters were before increasing and prevailing upwards, but now they are asswaged, and prevented from extending their orb by the passing of the Spirit over them. The Spirit had before acted through the earth. and by its impulse broke open the fountains of the Abyss and the windows of beaven, but it was now made to act in its usual way of pressing only or chiefly upon the surface: things therefore would now be returning to their former course, and the same effects ensue as had been largely described in the account of the first Formation, and so needed not to have been repeated here.

Hence we read in the next verse, The fountains of the Deep, and the windows of beaven were stopped, and

the rain from beaven was restrained.

This was no more than a consequence of setting the Powers of Nature to work, as at the first. The earth

had been dissolved, and all the atoms of the strata of stone floating loose and irregularly in the waters; but as foon as the natural agents began to operate, as foon as the outward and inward Expanse [i.e. the Light and the Air without and within the earth | began to act. to make a division between the waters, they would drive all the folid parts of the earth together (much in the fame manner as the fame Agents at present separate and impel the particles of slime and mud in dirty water) into a shell or crust and permit all the Fluids to flide between; fo that there would be two orbs of water and one shell of stone or the crust of the earth between them; as things were circumstanced on the fecond day after the creation, Gen. i. 6, 7. When, by the interposition of the solid shell of the earth, the waters were divided from the waters, and the earth would be in the fituation it is described to be in by St. Peter, (2 Epist. iii. 5.) during the beight of the Flood, And the Earth standing out of the water and in the water; whereby the world that then was, being overflowed with water, The account of the destruction of the perished. earth and of its Re-formation illustrate and confirm each other: in order to destroy the Earth the fountains of the Great Deep were broken up, and the passages of the Airs through the strata opened, but at the Re-formation, Moses tells us, they were both stopped or closed, and even the vapours for rain prevented from rising. So that the folid shell of the earth permitted neither the waters to descend, nor the vapours to ascend: and of course the Shell must before have been dissolved to atoms; for had it been only broken or fractured into large pieces, it could not have been so closed or joined together, but that both waters and vapours would have passed through; and in this case it could not have been said, that the passages of the Airs were stopped.

THE shell of the Earth having been thus consolidated and formed anew, did not, and indeed could not, remain long whole and entire. For, as the Expanse or Firmament had now received its full, if not new, powers of acting, the Light (which penetrates all terrestrial bodies) would soon make its way through the waters and strata of stone to the comparatively thinner medium or air at the center of the earth (for it must be remembered that the air or that part of our Atmosphere, which at the beginning of the deluge, was forced down into the Abyss, drove out the waters from thence, and elevated them over the furface of the whole earth, would there continue as long as that elevation lasted, and so constitute an inward Air or Firmament) cause there a rarefaction, and so increase the force of the inward Expanse, which by this means would act more strongly against the concave part of the shell of the earth, and by continuing to exert and extend its power on all fides from the center, would by degrees make fmall cracks and crevices in the shell, and at last by receiving new strength and increased vigour open and widen these cracks, so as to permit the water, that covered the furface of the earth, to be pressed down through them into the Abyss by the force of the outward Expanse, as was the case at the first Formation. it follows in the next verse

And the waters returned from off the earth continually. In the verse preceding, the fountains of the abys and the windows of heaven were closed, so that neither vapours nor waters could pass; but here we find that the waters are returning i. e. going back to the place from whence they came; they came, we saw, from the Abys, so that new inlets or apertures into the abys must now have been made for the descent of the waters, otherwise they could never have returned from whence they came; or have been gathered into

one [and their former] place. They returned from off the earth continually, or as translated in the margin, in going and returning, in flowing backwards and forwards, in fluctuating here and there; for as the Airs began to ascend before the Waters began to descend, they would of course impede and in part drive back the waters and so cause a fluctuating or reverberating motion in them; and by this means also the waters would be prevented from rushing down too fast and from tearing the shell of the earth too much.

VER. 4. And the ark rested—upon the mountains of Ararat. As antiquity, and the tradition of the coun-

try at present, testify."

VER. 8. And Noah sent forth a dove from him, to see if the waters were abated from off the face of the Ground: but the dove found no rest for the sole of her feet and she returned unto him into the ark. Again he sent forth the dove out of the ark. And the dove came into him in the evening, and lo, in her mouth was an olive-leaf or branch; an emblem of peace.] pluckt off: so Noah knew

ⁿ See Universal History, Vol. I. p. 239, &c.

o Some have imagined from the circumstance of the Dove's bringing Noah a leaf or branch pluckt from a tree, as a proof of the decrease of the waters, that this Tree must have been standing upright or in its original position: otherwise a branch pluckt from it could not have served for such a proof; and therefore, if the Tree was thus standing on the ground, it must follow, that the earth was not totally dissolved during the Deluge. But such seem not to have confidered that whether the earth was dissolved or not (but that it was, I think, I have abundantly proved above) it had been impoffible for any thing upon the furface, fuch as Houses, trees, &c. to have withstood the prodigious torrents of water that must have rushed down from the mountains, after they had been covered far above fifteen cubits high; but of all things, far less capable were trees and vegetables of withstanding these torrents, because as the waters had been out upon the furface of the earth for feveral months, it could not be, but that, by their irregular motions in flowing backwards and forwards, they must soon have dissolved, liquified or dissipated

that the waters were abated from off the earth. And he staid yet other seven days, and sent forth the dove; which returned not again unto him any more.

VER. 13. And Noah removed the covering of the ark, and looked, and behold, the face of the ground was dry.

So the dry-land appeared by the return of the waters to the place from whence they came, in the same manner as they had done at first, when God commanded that the waters under the heaven should be gathered together unto one place (the abyss) and the dry

land appear.

VER. 15. And God spake unto Noah [as God had ordered Noah to enter into the ark at a particular time, so Noah waits the divine command for his coming out] saying, Go forth of the ark, thou and thy wife, and thy sons wives with thee. Bring forth with thee every living thing that is with thee, of all flesh, both of sowl and of cattle, and of creeping thing that creepeth

the wegetable mould and all the loose parts on the upper surface of the earth; so that all trees would have fallen of course, as the ground, on which they stood, gave way: hence Noah could not but conclude (had he ever seen a common storm, attended with violent rain) that—in such an inundation as was That in his time, when God assured him, he would destroy the whole earth; all trees, &c. must have been thrown down upon the surface; and therefore if the Dove brought him a least from one, it must have lain along upon the ground; and so be as full a proof of the abatement of the waters, as if it had been standing upright. And that the olive-tree did thus lie. seems evident from the present state of things on and near the earth's surface; it being very common to find prodigious numbers of trees bying just beneath the vegetable mould, in such a manner as the waters rushing from the neighbouring mountains would naturally leave them.

But there is another folution to this difficulty, which, confidering the emblematical style of Scripture and the circumstances of the case, may be thought more just than the former; tho' very reconcilable with that interpretation. As it is particularly mentioned that Noah staid just seven days before each time of sending out the Dove, so in all probability the day on which he sent her out was the Sabbath; and the time of the day, just after he had performed religious service; as he might most reasonably think that would be the best for

upon the earth; that they may breed abundantly in the earth, and be fruitful and multiply upon the earth. And Noah went forth and his sons and his wife, &c. And God blessed Noah and his sons, and said unto them, be

fruitful and multiply, and replenish the earth.

HERE the same blessing for replenishing the earth with men is bestowed upon Noah and his family, as was pronounced upon the first pair of the human species; and a similar declaration made with regard to the brute-animals that came out of the ark to be fruitful and multiply upon the earth, as had been done at their first formation: whence it must follow, that the earth, after the flood, was as entirely void of any living creature of the land or air (except those that were preserved by the ark) as it was before any such were in being. And therefore the Deluge, in this respect, was unquestionably universal.

expecting a bleffing or a favour from heaven: Accordingly, at the fecond return of the Dove the divine fignal was brought, - an Olivebranch, an emblem of peace, in token that the waters were abated and the fury of Gop's wrath upon a wicked aworld was ceafing, and that joy and comfort would foon succeed to the afflicted rightcous. And unless this branch be looked upon as a divine signal and providentially given, it will be difficult to fay what could induce the Dove to bring any branch at all, - and why an Olive-branch, - and that this should be particularly mentioned; when saying that a leaf or branch was brought, had been sufficient, without specifying the tree from whence the branch was taken; unless something particu-And, that the Olive-brunch was lar had been intended thereby. an emblem or fign of Peace, Friendship, or Abatement of Anger, Difcord, &c. throughout almost the whole world. See Virgil's Ancid. Lib. viii. 116. & Lib. xi. 101. Liny. Lib. xxix. 16. Polylius, Lib. iii. And we learn from Columbus's Voyages, chap. 101. that this Symbol was used even in America. So then Noah as foon as he saw the Divine Signal, deciphered the meaning thereof, and knew that the waters were abated. In this view, it does not at all fignify, whether the tree, from whence the branch which the Dove brought was pluckt, was lying down or standing upright; for the particular species of tree spoke its own meaning.

An Explanation of the COPPER-PLATE,

REPRESENTING

The internal structure of the terraqueous Globe, from the Center to the Circumference, and the Air around it.

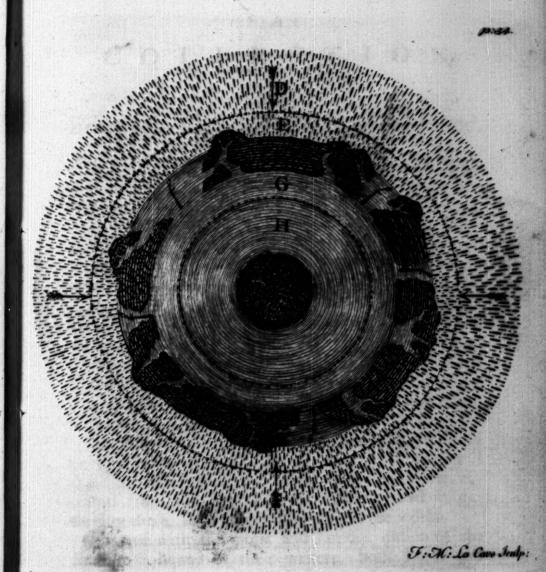
D The outward Expanse or the open Firmament of Heaven.

E. A circular Space filled with water during the height of the Deluge, but now with the Air that came from the central Hollow of the earth; and at prefent constitutes what we call our Atmosphere.

- F. The shell of the earth broken into innumerable apertures and fissures, of various shapes and sizes; the larger of which, f. f. f. f. f. being filled with the water that descended from the surface of the earth, form Seas and Lakes; the lesser (which branch from the former, or pass immediately from the under-part of the shell of the earth to the tops of the highest mountains) serve as canals for the water which supplies Springs and Rivers to run in; the least of all (denoted by the irregular black strokes in the solid shell of the earth) represent the cracks thro' which vapours principally ascend.
- G. H. The Great Abysis of water within the earth; with which all Seas, Lakes, Rivers, &c. communicate; and from whence they receive their supplies. G. H. are divided from each other by a dotted circle, because one of them represents the water that, during the Deluge, covered the whole surface of the earth, but which was afterwards forced down, thro' the above-mentioned larger apertures and fissures, to its original place, as the inward Air was forced out thro' the lesser and oblique fissures: and the other of them represents that part of the Abysis which, during the Deluge, remained beneath the earth.

I. A folid Ball or Nucleus of terrestrial matter, formed from what the water in its descent from the surface, and passage through the strata of the earth, tore off, and carried down with it into the Abys, and reposited at the lowest place, the center of the earth.

fembling an Egg has great propriety in it: for the Central Nucleus, (I.) by its innermost situation and shape, may well represent the Yolk; the Abys of water, (G. H.) which surrounds it, and is in a middle position, may stand for the elear Fluid of the White; the Crust of the Earth (F.) (allowing only for its breaks and cracks) by its roundness, hardness, uppermost situation, and little inequalities on its surface, is justly analogous to the Shell. And on this account the term the shell of the earth is frequently used in this treatise.



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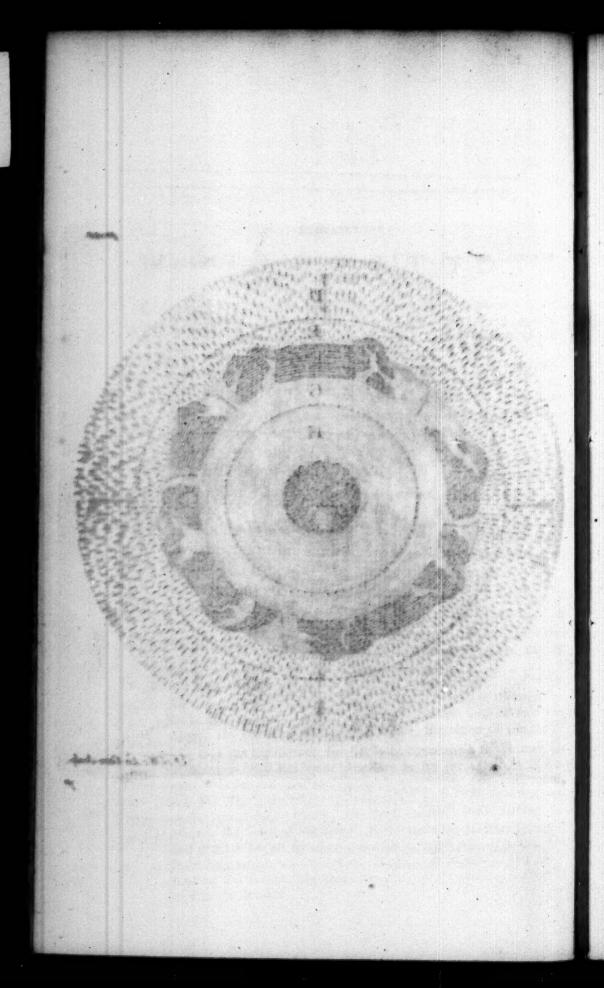
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A

COLLECTION

OF THE

Principal Heathen Accounts of the Flood.

**AVING given at large an explanation of the H Mosaic History of the Deluge; I shall now fubjoin the testimonies of several Heathen Nations in proof of the same fact. For, it may justly be supposed, that did any such event really happen, it could not be but that all or most nations upon the earth must have retained some knowledge or tradition of it. And if upon enquiry it should appear that the same of the Deluge has gone throughout the whole world, that almost every nation upon earth has some story or other to relate concerning it; it will certainly follow, that there has been such an Event, and that it was universal. But of such deductions and corollaries as these hereafter.

To collect all the evidence that might be produced on this occasion would be endless and needless; I shall therefore select here and there particular accounts from the most eminent nations; and in gathering these, shall travel quite round the world.

I BEGIN with the great and famous nation of the Romans. Many of their writers, both Poets and Historians, make mention of an universal Flood; but one may speak the voice of all. I shall take That of Ovid; who, purposing to relate some particular circumstances of the history of mankind from

the beginning, regularly proceeds from the formation of man, thro' the several ages of the world, to the time of the Deluge; the cause and manner of which (after having related the height of impiety and wickedness that reigned upon the earth during the iron-age) he thus describes, Metam. Lib. 1.

Neve foret terris securior arduus æther, &c. i. e.

- 'Nor were the Gods themselves more safe above;
- · Against beleaguer'd Heaven the Giants move:
- 'Hills pil'd on hills, on mountains mountains lie,
- 'To make their mad approaches to the sky.
- 'Till Jove no longer patient, took his time 'T'avenge with thunder their audacious crime;
- Red lightning play'd along the firmament,
- ' And their demolish'd works to pieces rent.
- ' Sing'd with the flames, and with the bolts transfix'd,
- With native earth their blood the monsters mix'd;
- . The blood, indu'd with animating heat,
- 'Did in th' impregnant earth new sons beget.
- 'They, like the feed from which they fprung, accurs'd,
- · Against the Gods immortal batred nurs'd;
- 'An impious, arrogant, and cruel brood;
- Expressing their Original from Blood.
 - Which when the King of Gods beheld from bigh-
- "He figh'd; nor longer with his pity strove;
- But kindled to a wrath becoming Jove .-
 - " Mankind's a monster, and the ungodly times
- " Confederate into guilt, are sworn to crimes.
- " All are alike involv'd in ill, and all
- " Must by the same relentless fury fall." ?

This answers to the Scripture account of the Giants, the Apostates (those rebels to the Will of Heaven or Word of God) that were before the Flood, and to the children, the Sons, that sprang from them, who were aworse than their Fathers, see Gen. vi. 1—5.

[&]quot;Gen. vi. 12. And God LOOKED UPON the earth, and BEHOLD it was corrupt; for all Flesh had corrupted his way upon the earth.

'Thus ended he; the greater Gods affent, By ciamours urging his fevere intent; 'The less fill up the cry for punishment. 'Yet still with pity they remember man And mourn as much as beav'nly Spirits can. - But Fove Concludes to pour a watry Deluge down, And what he durst not burn, resolves to drown. 'The Northern breath, that freezes floods, he binds. With all the race of cloud-dispelling winds. The South he loofed, who night and horror brings: And fogs are shaken from his flaggy wings. With rain his robe and heavy mantle flow, And lazy mists are lowring on his brow. The skies from pole to pole with peels resound. And show'rs inlarg'd come pouring on the ground. - Impetuous rain descends. Nor from his patrimonial Heav'n alone 'Is Yove content to pour his vengeance down. Aid from bis Brother of the seas he craves; 'To help him with auxiliary waves. 'The watry Tyrant calls his brooks and floods. Who roll from mossy caves (their moist abodes);-'The floods, by nature enemies to land, And proudly fwelling with their new command, Remove the living stones, that stop'd their way. ' And gushing from their source, augment the sea. Then with his mace their Monarch struck the ground With inward trembling earth receiv'd the wound,

And it REPENTED the Lord that he had made man on the earth, and it GRIEVED him at his heart. And the Lord said, I will destroy man whom I have created, &c. and bring a FLOOD OF WATERS upon the earth to destroy all sless, &c. The reader, as he proceeds, may make many such striking resemblances as these between Scripture and Heathen History.

'And rifing streams a ready passage found.

. Th' expanded waters gather on the plain;

They float the fields and overtop the grain;
Then rushing onwards with a sweepy sway.

Bear flocks and folds and lab'ring hinds away.

· Nor fafe their dwellings were, for fap'd by floods,

Their houses fell upon their houshold gods.

- The folid piles too strongly built to fall,
 High or'e their heads behold a watry wall.
- Now Seas and Earth were in confusion lost;
- A world of waters, and without a coast.—
- The most of mortals perish in the flood;
- 'The small remainder dies for want of food.
 'A mountain of stupendous height there stands
- Betwixt th' Athenian and Baotion lands,

· Parnassus is its name; whose forky rife

- ' Mount thro' the clouds, and mates the lofty skies.
- ' High on the Summit of this dubious cliff,

Deucalion wasting, moor'd his little skiff.
 He with his wife were only left behind

· Of perish'd man; they two, were buman kind.

'The mountain Nymphs and Themis they adore,

And from her Oracles relief implore.

4 The most upright of mortal men was he,

. The most fincere and boly woman, she.

'When Jupiter, surveying earth from high

Beheld it in a lake of water lie;

'That were fo many millions lately liv'd,

But two, the best of either sex surviv'd;

- ' He loos'd the Northern Wind; fierce Boreas flies
- 'To puff away the clouds and purge the skies:

· Serenely, while he blows, the vapours driv'n

Discover Heav'n to Earth, and Earth to Heav'n .-

FROM Rome let us proceed to Greece. I shall here take the testimony of Lucian or the author of the book de Dea Syria, as it will include that of the Scythians,

Syrians, and Arabians, as well as Grecians. O. usv ουν πολλοι Δευκαλιωνα, &c. i. e. 'Many fay that this temple [that at Hierapolis in Syria] was built by Deucalion, the Scythian. That Deucalion, I mean, in whose time the greatest inundation of waters was. I have heard in Greece, what the Grecians fay concerning this Deucalion. The story they relate, is as follows: The present race of men was not the first, ' for they totally perished; but is of a second genera-4 tion, which being descended from Deucalion, increased to a great multitude. Now of these former men they relate this story: they were insolent, and addicted to unjust actions; for they neither kept their oaths, nor were hospitable to strangers, nor ' gave ear to suppliants; for which reason this great calamity befel them: on a sudden the earth poured forth a vast quantity of water, great showers fell, the rivers overflowed, and the sea arose to a prodigious height; fo that all things became water, and 'all men were destroyed: only Deucation was left unto a fecond generation, on account of his prudence and piety. He was faved in this manner: he went into a large ark or chest which he had, together with his fons and their wives; and when he was in, there entered fwine, and horses, and lions, and serpents, and all other creatures which live on earth, by pairs. He received them all, and they did him ono hurt; for the Gods created a great friendship a-" mong them; fo that they failed all in one cheft while the water prevailed. These things the Greeks relate of Deucalion. But, as to what happened after this, there is an ancient tradition among those of 'Hierapolis, which deferves admiration; viz. that ' in their country a great chasm opened, and received 'all the water; whereupon Deucalion erected altars, and built the temple of Juno, over the chasm. This chasm I have seen, and it is a very small one under the temple; whether it was formerly bigger, and since lessened, I cannot tell; but that which I have seen is little. In commemoration of this history, they do thus: Twice in every year water is brought from the sea to the temple, and not by the priests only, but all Syria and Arabia, many come from beyond Euphrates to the sea, and all carry water, which they first pour out in the temple and afterwards it sinks into the chasm; which, tho' it be small, receives abundance of water. And when they do this, they say Deucalion instituted the ceremony in that temple, as a memorial of the cala-

mity, and of his deliverance from it.

We will next pass to Egypt; whose ancient inhabitants have retained the knowledge of the Deluge under the histories of Osiris and Typhon; as is evident from what Plutarch fays concerning them in his Isis and Ofiris. For first he informs us p. 30, (of Squire's edition) that they relate, 'that when Ofiris was born, a voice was heard, faying, The Lord of all the earth is born,' and p. 42. that ' in their funeral-lamentation over him, they bewail'd him, who was born on the " right side of the world, and who perished on the left." P. 17. 'He is faid to have been put into a cheft,' and they particularly affert, that it was on the 17th day of the month Athyr [fee Gen. vii. 11] and thrown into the fea." After these things Ofiris is said to have returned from the other world, and to have appeared to his fon Orus .-- The person who thus used Ofiris is said to have been one Typho, which name the Egyptians

LUCIAN de Dea Syria, Tom. 11. p. 882. Vid Univer. History Vol. I. p. 203.

The name Typho according to some learned men signisses a Deluge or Inundation; see Jurieu's Doctrines and worship of the church. Part. 111. Tr. 1v. And Typhon, or as the Latin Poets call him

explain by interpreting it the Sea, and they call the falt of the fea, Typho's foam, p. 42. and p. 54, agreeable to this interpretation is what we are further told, that Typho was once in possession of the portion or province which belonged to Osiris; by which they mean, that Egypt was once covered with the Sea. Which opinion, say these philosophers, is probable enough, from that great number of sea-shells, which are not only dug out of their mines, but found likewise upon the tops of their mountains; and hence likewise it is, that their fountains and wells, though many in number, have all of them a brackish or saltish take, with them, as containing the vapid relics of the sea-water, which once covered their whole country.

FROM Egypt we will proceed to Babylon, and fee what the Chaldeans relate of the Deluge. I shall cite their testimony as preserved by Josephus, in the first book of his Jewish Antiquities, p. 10. Te de ualanduomov rouls, &c. i. e. But of this [the Noachian] Deluge and the ark all the beathen bistorians make mention among whom is Berofus the Chaldman, who, relating the particular circumstances of the Deluge, writeth thus, 'It is reported, that part of the ship as yet remaineth in Armenia on the mountain of the · Cordyeans; and that some persons taking off the 'alphaltus [bitumen or pitch] carry it away; and that men make use of that which is thus taken off, by way of charm, to avert evil.' And again, in his dispute with Apion, he publickly appeals to the testimony of the same Berosus, as being agreeable to that of Moles (Book the 1st. p. 1044.) Olle Tours

Typeus, is represented as a monstrous Giant warring against heaven; and who was at last overcome by Jupiter, and as one says, lies new fubmersed in water. Apoll. Arg Lib. 2. The Arabs at this day express the general Deluge by the word al tusan; Universal Hist. Vol. L. p. 200.

& Browso &, &c. ' Now this Berofus following the most ancient records, writeth the history of the Deluge, and of the destruction of mankind therein, just as " Moses hath related it; and also of the Ark, in which ' Noah, the Chief or Leader of our race, was faved when it was carried to the tops of the Armenian ' mountains.' And if the Babylonian Antiquities, that now pass under Berosus's name, be truly translated from the Original (and I see no reason to imagine that they are not, fince, as far as they remain, they are confiftent with, at least do not contradict, what Josephus and other writers have quoted from the Original') his account of the Deluge is as follows, 'Ante aquarum cladem famosam, &c. i. e. · Before that famous devastation of waters, in which the whole world perished, many ages had passed, which were faithfully remarked by our Chaldeans.' · They write that in those times there was a great city of Giants, called Eno, situated near Libanus, who governed the whole world, from the rifing to the fetting of the fun. These trusting to the greate ness of their bodies and strength, and having invented arms oppressed all, and being slaves to their · luft found out musical instruments, and all kind of delights. They devoured men, and procured abortions on purpose to dress them for food; they proe miscuously lay with mothers, daughters, sisters, men and brutes; and there was no kind of wickede ness which they did not commit; they were defpifers of religion and of the Gods. Then many foretold and prophesied, and carved out upon

t I think what his Lordship says on this head in the first part of bis Vindication of the histories of the Old and New Testament, p. 121—128. justifies this assertion. Berosus was a Chaldwan Priest; and lived about 270 years before the birth of Christ.

fones the things relating to that destruction which was foon to come upon the world. But they. following their old courfe, derided all fuch admo-'nitions, tho' the anger and revenge of the Gods were ready to fall upon them for their impiety and wickedness. There was one among the Giants who reverenced the Gods and was more wife and prudent than all the rest; his name was Noa; he dwelt in Syria, with his three fons Sem, Japet, Cham, and their wives the great Tidea, Pandora, Noela, and Noegla. This man, fearing the destruction which he forefaw from the stars would come to pass, began, in the feventy-eighth year before the inundation, to build a 6 ship covered like an ark. Seventy-eight years from the time he began to build this ship, the Ocean of a ' fudden broke out, and all the inland feas, and the rivers and the fountains burfting from beneath, (attended with most violent rains from heaven for many days) overflowed all the mountains; fo that the whole human race was buried in the waters; except Noa and his family who were faved by means of the ship; which being lifted up by the waters, rested at last upon the top of the Gordyean mountain; of which, it is reported, there now remaineth ' fome part, and that men take away the bitumen from it, and make use of it, by way of charm or expiation, to avert evil.——We must therefore allow from these premises, that which both the " Chaldwans and Scythians write of, that, after the 'earth was dried from the waters, there were no 'more than the above-mentioned eight persons in ' Armenia Saga, and that from these all men upon earth fprung; and for this reason it is, that the ' Scythians justly say and call NoA the father of all the greater and leffer Gods, the author of the human race, ' the Chaos, and feed of the world.

From the Babylonians we will go to the Affyrians, For whom let Abydenus speak, whose authority is thus cited and publickly appealed to by Eusebius, Prepar. Evang. Lib. IX. Cap. 12. "Med" ov addos TE notav, xi · Engile &c. After whom others reigned, and then Sifithrus; to whom Saturn foretold that there ' should be a great flood of waters (or many showers) ' upon the fifteenth day of the month Desuis; and ordered him to hide whatever writings he could find, ' in Heliopolis, a City of the Sippari. Sisibrus having ' performed this, immediately failed towards Arme-' nia; and inftantly after, those things which God had foretold came to pass. And on the third day, when the tempest was ceased, he made a trial, by fending out birds, to fee if they could espy any land uncovered of water. But they finding nothing but the immense Ocean, and not knowing which way to direct themselves, returned to Sistibrus; and after these he sent out others. That the third time it answered, for the birds returned with their feet 'all mudded. But as for Sifitbrus, the Gods took him from among men. And the Ship was carried to Armenia, and afforded the people of the country 'amulets of wood, to dispel diseases."

FROM Assyria we will pass into Persia. Dr. Hyde, in his Historia religionis veterum Persarum, p. 171. writes thus, Veterum Persarum orthodoxi credunt—

[&]quot;That by the Floods of Deucalion and Sifitbrus, as also that which is said to have happened in the time of Ogyges, the ancients could mean no other than the general Deluge in the time of Noah is abundantly evident from the relations themselves, but if the reader is desirous to see it circumstantially proved, he may consult the sollowing Treatises, Bp. Stillingfleet's Origines sacræ, Lib. iii. ch. 5. §. 5. Gale's Court of the Gentiles, Part I. Book 3. ch. 6. Ray's Three Phys. Theol. Discourses, p. 66. Kircher's Arca Noæ, Lib. 2. cap. 6. Grotius de Verit, Lib. 1. cap. 16. Heidegger's Hist. Patriar. Exer. xviii. § xliii.

diluvium, &c. 'The orthodox among the ancient Per-' fians believe a Deluge, and that it was universal, and overwhelmed the whole earth. But as they have various opinions and fentiments concerning all those ' things which are so remote in antiquity, they differ ' fomewhat among themselves and run into fables. ' For Ibn Shabna, the Arabian, in his book de Primis ' & Postremis afferts, That there are some among the ' Magi who deny a Deluge; - others he fays, acknow-'ledge it; but fay that it was not universal, and that 'it did not reach beyond the top of a mountain near 'Hulvan; a city fituated between the confines of As-'syria and Persia. From the opinion of Zoroaster they maintain, that there had not been a Deluge, 'neither had the world been drowned, but for the 'iniquity and diabolical wiles of that most wicked of 'mortals, Malcus. In the Book Pharb. Sur. the famous mountain, where Noah dwelt when the wa-' ters of the deluge broke out from it, is mentioned; 'and Zala-Cupha is faid to be the name of the old wo-' man, from whose oven the waters first issued out.'

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ii. 6. FROM Persia we will enter the East-Indies, which country being vastly extensive, the inhabitants numerous, and of different sects and orders, it is no wonder that some (as is asserted) deny a Deluge, and others affirm that there has been one. But if the tradition of it has reached this part of the world, it will be sufficient for our purpose. Lord in his Discourse of the Banian Religion, c. 6 & 7. informs us, 'That' the Bramins say, that the four tribes or casts, of which the first race of men consisted, degenerating from their primitive innocence,—the Priest neglecting his piety, the Soldier becoming insolent and ty-rannical, the Merchant practising deceit in trade, and using salse balances, and the Artizan spending the profits of his inventions in riot and excess;—their

' impiety and wickedness grew at length to so infusfer-'able an height, that Goo's indignation was justly provoked, and he fent a Flood, which destroyed all nations without exception. After which Goo, to repair mankind, created three persons of greater ex-' cellency than those of the former generation; to one of whom named Bremaw, he gave the power of cre-' ating men and animals, which he executed according-'ly: the first human pair proceeding, one from his ' right side, the other from his left. The man was ' called Manow, and the woman Ceteroupa, and by them was the earth replenished.'" Father Bouchet, speaking of the Indians, especially those that live about Maduras and Carnate, writeth more largely thus," 'They say, that Parabaravasion, i. e. the Supreme God, has created three inferior Divinities, viz. Bruma, Vichnou, and Routren. To the first he has given ' the power of creating; to the second of preserving; ' and to the third, that of destroying. The God Routren, who is the grand destroyer of all created beings, refolved one day to drown all mankind, pretending he had just reasons to be distatisfied with their behaviour. This de ign was not kept fo fecret, but it was found out by Vichnou, Preserver of all creatures, who discovered the very day on which the 'Flood was to happen. Though his power did not extend fo far as to suspend the execution of what the God Routren had refolved upon, yet, as he was the God-preferver of all created beings, this gave him a ' right to prevent, if possible, the pernicious effects of it. The method he took for that purpose was as follows. He one day appeared to Sattiavarti, his

[&]quot; Univer Hist. Vol. I. p. 229.

^{*} See his Letter to the Bishop of Avranches, printed in Picari's Cerem. abrid. p. 379.

great confident, and privately affured him, that an universal Flood would foon happen; that the earth would be covered with water, and that Routren's defign was no less than that of thereby destroying all ' mankind, and every kind of animal. He neverthee less affured him that he himself need not be under the least apprehensions; for that in spite of Routren, he would find opportunity to preferve him, and to e take fuch measures, that the world should afterwards be re-peopled. His defign was to make a wonder-' ful bark rife up on a fudden, at a time when Routren ' should least suspect any such thing, and to store it with a large provision of souls and feeds of beings, ' eight hundred and forty millions at least. As for ' Sattiavarti, he, at the time of the Flood, was to be 'upon a very high mountain, which he pointed out to him very exactly. Some time after, Sattiquarti, 'as had been foretold him, perceived a numberless 'multitude of clouds drawing together, but beheld with unconcern the storm which was gathering over the heads of the guilty, when the most dreadful rain that had ever been feen, poured down from the ' skies; the rivers swelled, and spread themselves with rapidity over the surface of the whole earth; the sea broke its appointed bounds, and mixing with the rivers, which now had left their channels, foon co-' vered the highest mountains. Trees, animals, men, cities, kingdoms, were all drowned; in a word, all 'animated beings were inftantly destroyed. In the ' mean time, Sattiavarti, with some of his penitents, ' had withdrawn to the appointed mountain, where he ' waited for the succour which God had promised him. ' However, this did not prevent his being seized with ' fome short intervals of terror. As the water ga-' thered strength continually as it rolled, and each mo-' ment drew nearer to his Afylum, he was every now

and then in a panic. But that very instant which he thought would be his last, he beheld the bark ' that was to fave him: No fooner did he fet his eyes 'upon it, than he immediately got into it, with all ' the devotees in his company, and also the eight hundred and forty millions of fouls and feeds of beings. 'The difficulty now was how to steer the bark, and to preserve it from the impetuosity of the waves, which raged with prodigious violence; but Vichnou took care of this; for immediately affuming the ' shape of a fish, he steered the ship with his tail, as ' though it had been a rudder. The God who was 'now both fish and pilot, played his part so well, ' that Sattiavarti waited very quietly in his Afylum, 'till · fuch time as the waters were run off from the furface of the earth.'

WE come now to China. Among whose Inhabitants we find the knowledge of the Deluge still remaining; only fome affert that it was but partial; tho' others maintain that it was general. The authors of the Universal History, Vol. I. p. 204. (quoting Anciennes relations des Indes, & de la Chine, p. 67.) write thus, 'An Arab, who travelled into China about ' the beginning of the ninth century, giving an ac-· count of a conversation he had with the Emperor, among other things, fays, that mentioning the 'Flood to that Prince, on occasion of a picture of . Noab which he shewed him, and telling him, that 'that prophet, and those that were faved with him 'in the ark, peopled the whole earth; the Emperor 'laughed, and faid, 'Thou art not deceived as to "the name of Noah; but as to the universal Deluge, " we know nothing of it. It is true, that the Deluge "[fo even these allow a Deluge] did drown a part of " the earth; but it did not reach so far as our country, " nor yet to the Indies," Which last circumstance is just as probable, as what, those among the Persians who denied the universality of the Deluge, afferted, viz. that it reached no farther than Hulvan, a city on the confines of their country (p. 65.). But we have already shewed the impossibility of such a Deluge; (p. 45.) and therefore this confession must be the remains of the Flood in the time of Noab. And that it really is fo, or that the tradition of the Flood as held by some of them is the same with Noah's, seems certain, because (as Martinius observes, Sin. Hist. Lib. 1. p. 12.) ' The Chinese history of the Deluge ' falleth in nearly with the time of the Noachian, for 'it preceded the common christian æra about three 'thousand years.' Besides; many reasons may be given to prove that their first king, Fohi, was no other than the scripture Noah. For first (to use the words of Dr. Shuckford on this occasion in his Connect. of Sacr. & Prof. History, Vol. I. p. 29, 102.) ' The "Chinese antiquities reach no higher than the times of Noah, for Fohi was their first King. Their writers in the general agree, that Fobi lived about 2952 ' years before Christ: the Author Mirandorum in Sina · & Europa, computes him to reign but 2847 years before our Saviour, and Alvarez Sevedo places his reign not so early, imagining it to be but 2060 ' years; and all these computations agree well enough with the time of Noab; for Noab was born, according to Arch-bishop Usher 2948 years, and died 2016 years, before Christ; so that all the several ' computations fall pretty near within the compass of ' Noah's life. And therefore we may conclude Moses's ' Noah and the Chinese Fohi to be the same person. But, 2dly. They say Fobi had no father, i. e. Noah ' was the first man in the postdiluvian world; his an-' ceftors perished in the Flood, and no tradition thereof being preserved in the Chinese annals, Noab or

Fohi stands there as if he had had no father at all. gdly. Fobi's mother is faid to have conceived him encompassed with a rainbow; a conceit very probably arising from the rainbow's first appearing to Noah, and the Chinele being willing to give some account of its original. 4thly. Fabi is faid to have carefully · bred seven sorts of creatures, which he used to sacrifice to the supreme Spirit of beaven and earth; and " Moses tells us, that Noah took into the ark, of every clean beaft by fevens, and of fowls of the air by fevens. · And after the flood built an altar, and took of every · clean beast, and every clean fowl and offered burntofferings. 5thly. The Chinese derive the name of · Fobi, from his oblation, and Moses gives Noab his name upon account of the grant of the creatures for the use of men, which he obtained by his Offering. Laftly, the Chinese history supposes Fobi to have fettled in the province of Xeufi, which is the Northwest province of China, and near to Ararat where ' the Ark rested.'

FROM China we will pass into America; an immense tract of land unknown to us'till lately; and yet when first discovered, the people thereof almost universally retaining the knowledge of the Deluge. Acosta in his History of the Indies (one of the first Treatises printed on the subject) Lib. 1. c. 25. speaketh thus in general, 'They [the American Indians] make great men-' tion of a Deluge, which happened in their country: but we cannot well judge, if this Deluge were the universal (whereof the Scripture makes mention) or ' fome particular inundation of those regions where 'they are. Some expert men fay, That in those ' countries are notable figns of fome great inundation, ' and I am of their opinione which thinke that these ' marks and shewes of a deluge, was not that of Noe, but some other particular, as that which Plato

' fpeaks of, or Deucalion's Flood which the poets fing of: whatfoever it be, the Indians fay, That ALL ' men were drowned in this Deluge. And they re-' port, that out of the great lake Titicaca, came one · Viracocha, which staid in Tiaguanaco, where at this day there are to be seene the ruines of ancient and very strange buildings, and from thence came to " Cusco; and so begane mankind to multiply. They ' shew in the same island a small lake, where they faine that the Sunne hid himself, and so was pre-' ferved, and for this reason they make great facti-' fices unto him in that place, both of sheepe and 'men. Others report that fix, or I know not what 'number of men, came out of a certaine cave by a windowe; by whom men first begane to multiply; ' and for this reason they call them Pacaritampo. And ' therefore they are of opinion, that the Tambos is the " most ancient race of men. They say also, that Man-'go Cupa, whom they acknowledge for the founder and chiefe of their Inguas, was issued of that race, and that from him fprang two families or linages; the one of Havan Cusco, the other of Hurni Cusco. 'They fay moreover, that when the Kings [Inguas] attempted warre and conquered fundrie provincies, they gave a colour and made a pretext of their enterprize, faying, That all the world ought to ac-'knowledge them; for all the world was renued by their race and country: and also, that the true reli-' gion had been reveiled to them from heaven.' Bur as America may be looked upon as a little world of itself, it may be expected that I should be fomewhat more explicit than giving a fingle general

testimony; I shall therefore traverse it throughout, as I have done in relation to other parts of the earth.

y See Note u p. 64, and what follows shews that it was a tradition of the Universal Flood.

And first, for the upper or Northern part of America. Hennepin in his new dicovery of a vast country in North America, (vid. Continu. of the new Discovery, &cc. p. 54.) says thus, 'Other Savages upon the same 'continent, are of opinion, that a certain Spirit, 'called Othon by the Iroquois, and Atahauta by the other barbarians at the mouth of the river St. Lau-rence, is the Creator of the world, and that one 'Messou repaired it after the Deluge.—They say, that 'this Messou or Othon being a hunting one day, his 'dogs lost themselves in a great lake, which thereupon 'over-slowing, covered the whole earth in a short 'time, and swallowed up the world. They add, 'that this Messou or Othon gathered a little earth together by the help of some animals, and made use

' of this earth to repair the world again,' From the nations of the Iroquois, &c. we will defcend fouthward to Cuba. ANTONIO DE HERRERA in his History of America from the first discovery thereof; with the best accounts the people could give of their antiquities; collected from the Original relations sent to the Kings of Spain, translated from the Spanish, by Capt. John Stevens, Decad. I. Book ix. C. 11. informs us, That the people of Cuba knew that heaven, the earth, and other things had been created: and faid they had much information concerning the Flood, and that the world had been destroyed by water, by ' three persons that came three several ways. Men of 'above seventy years of age said, that an old man knowing the Deluge was to come, built a great fhip, and went into it, with his family and abundance of animals, that he fent out a crow, which did ' not return, staying to feed on the dead bodies; and 'afterwards returned with a green branch; with other e particulars, as far as Noah's fons covering him when drunk, and the other fcoffing at it; adding, that

s the Indians descended from the latter, and therefore had no coats nor cloaths: but that the Spaniards descending from the other that covered him, were therefore cloathed and had horses. What has been here faid, was told by an Indian of above seventy vears of age to Gabriel de Cabrera, who one day quarrelling with him, called him dog, whereupon he 'asked, Why he abused and called him dog, since they were brethren, as descending from the two fons of him that made a great ship, with all the rest that has been faid above. The fame he repeated in the presence of several Spaniards, after his master ' had reported it.'

FROM Cuba we will pass to Terra-Firma, the first country of South-America. The last cited Author acquaints us, Decad. 11. Book I. chap. iv. that the inhabitants of Castilla del Oro (in Terra-Firma), said, 'That when the universal deluge happened, one man with his wife and children, escaped in a canoe, and ' that from them the world had been peopled; as also 'that there was one LORD in heaven, who fent the 'rain and caused all the celestial motions. 'there was likewise a very beautiful woman in heaven, 'with a child; but they went no farther, nor did

'they know any thing of their own original.'

BORDERING upon Terra-Firma is Peru. 'The an-' cient Indians (fays the above cited Author, Decad. 111. Book x1. chap. 1. speaking of the Peruvians) report-'ed, they had received by tradition from their an-'cestors, that many years before there were any Ingas '[Kings], at the time when the country was very 'populous, there happened a great Flood; the sea breaking out beyond its bounds, so that the Land 'was covered with water, and all the people perish-To this the Guancas inhabitating the vale of ' Xausca, and the natives of Chiquito in the province

of Collao, add, That some persons remained in the hollows and caves of the highest mountains, who

again peopled the land. Others of the mountainpeople affirm, that all perished in the Deluge, only

fix persons being saved on a float; from whom de-

' feended all the inhabitants of that country.'

FROM Peru we will pass into Brasil. NIEUHOFF in his Voyages, &c. to Brafil, p. 150. writes thus: 'The 6 most barbarous of the Brasilians inhabitating the inland countries fcarce knew any thing of religion or an almighty being. They have some knowledge remaining of a general Deluge it being their opinion, that the whole race of mankind were extirpated by a general Deluge, except one Man and his own fifter, who being with child before, they by degrees ' re-peopled the world.' But Monf. Thevet speaking of the Brafilians that lived near the fea-coast, viz. at Cap de Frie or C. Frio, gives their account of the Deluge very circumstantially thus (Cosmographie univerfelle, Tome quatrieme, Livre xxi. cap. iiii.) Le Deluge donc, que ces Barbares chantent & duquel m'ont · fouventfois parlé, &c. The Deluge which these Savages talk fo much about, of which they fpoke often to me, was in their opinion universal; they · fay, that Sommay, a Carribee of great dignity,-had two children, the name of one was Tamendonare, ' the name of the other Ariconte, who were of different complexions and natures, and therefore mortally hated each other. - Tamendonare (they fay) was a ' good œconomist, having a wife and children, and took great delight in cultivating the earth: Ariconte, on the contrary, regarded not this, being folely bent on war, and defiring nothing but to subdue by his power all the neighbouring nations, and even his brother. It happened as this warrior returned one day from the battle, he brought the arm of

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ned of his enemy to his brother Tamendonare, telling him with great haughtiness, go, coward as thou art, I ' shall have this wife and children in my power, thou art not strong enough to defend thyself. Tamendoare hearing his brother speak thus, was very much ' grieved at his pride, and faid to him, If thou wert fo valiant as thou boaftest, thou wouldst have brought thine enemy entire. Ariconte incensed at this reproach, threw the arm against the door of his brother's house: but at the same instant, the whole village, where they were, was carried up into the fky, and they remained on earth. Tamendonare feeing this, whether out of aftonishment or passion, struck the ground, fo violently, that out of it iffued a great fource of water, which flowed fo high, that in a fhort time it reached the hills and mountains, and feemed to exceed the height of the clouds, and which continued till the earth was entirely covered. The two brothers feeing this, and follicitous to fave themselves, ascended the highest mountains of all 'the country, and with their wives got upon the trees that were thereon. Tamendonare climbed up a tree, ' named Pindona, (of which there are two forts; one, 'whose fruit and leaves are much larger than the ' other) taking with him one of his wives: Ariconte with his wife climbed up another tree, named Geni-' par; that they might see if the waters were abated. Whilst they were there, Ariconte offered some of the 'fruit of his tree to his wife, faying, break off a 'piece of this, and let it fall down; which being 'done, they knew that it was not yet time to descend 'into the vallies, and that the waters were yet very ' high. They affert, that by this deluge all mankind and all animals were drowned, except the two bro-' thers and their wives: from whom afterwards fprung 'two different people, called Tonassearres, surnamed

'Toupinambaux, and the Tonaiatz Hoyanas, furnamed Tominous, who live in perpetual difford and war:

hence also it is that the Toupinambaux, when they

' are defirous of praising themselves as above their ineighbours, say, we are descended from Tamendo-

' nare, and you from Ariconte; as if by this they

would infer, that Tamendonare was a better man than 'Ariconte.'

Thus I have travelled quite round the world, and shewed that the same of the Deluge has gone throughout. I am now to draw some conclusions or corollaries from what has been advanced. These shall respect principally the certainty that there has been a Flood,—that it was universal,—that the Mosaic account is true or written by one inspired by God, the author of the Event.

First, with regard to the certainty of the Flood, I may argue in the manner of Aristotele, 'What seems true to some wise men is somewhat probable; what feems so to most or to all wise men is very probable; what most men, both wise and unwise, assent unto, doth still more resemble truth; but what men generally consent in, hath the bigbest probability, and approaches near to demonstrable truth: Surely then, what men universally agree in, what, I may say, all nations (otherwise differing in opinion, customs, language, religion, and even ignorant of one another's existence) have, throughout all known ages, affented unto, may well pass for an establish'd axiom and a demonstrable truth. And such I have shewed is the state of the case with regard to the knowledge of the deluge.

AGAIN; the report of the Flood must have come from some quarter or other, and when or wheresoever it was first published, the relation of a fact so extraordinary, would naturally raise the curiosity of the first hearers, and excite them to inquire into the truth of

it. Now if they discovered that the report was false or groundless; the history would have been immediately discredited, and the relater and his story 'no more heard of: But the tradition prevailing universally, it is certain that such an event did happen;—and moreover that it was universal in its effects, else-

it could not have been univerfally believed.

Which (fecond) article is further evident from the afore-cited testimonies themselves; for in all those that are tolerably full and explicit, we find a method mentioned by which a few escaped out of the general destruction, from whom the world was afterwards peopled; which is a plain confession, that according to their opinion the whole race of mankind (except the few allowed to be saved) was destroyed; and so the

deluge universal.

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But farther yet; an universal deluge, is not an article of mere speculation, or a point, the certainty of which, might be proved only by properly examining the afferter thereof, but is an Event, a Fast in Nature, and of fuch a peculiar kind that did fuch ever happen, it could not but have left undeniable marks of its existence on every part of the earth; and so the relater of fuch an event might have been confuted or his adversaries convinced on the spot. Especially was this confutation or confirmation eafily to be established in the first ages of the world; or rather, This is a point which could not but be then fettled. For as men began to multiply after the flood, they would of course separate and divide, and so re-people the earth; and as they thus feparated they could not fail of knowing whether the Flood was universal or not. For, if they could find no human inhabitants in the countries to which they came, nor any marks of their former works, as houses, palaces, temples, gardens, &c. and could ice nothing but ruin and devastation in the things that

did remain, they would certainly conclude that the deluge was univerfal: On the contrary, if, as they dispersed or endeavoured to disperse, they found the neighbouring countries still full of inhabitants, the lands cultivated, &c. they would as certainly conclude that the deluge had not been universal. And from this infallible and unavoidable means of knowing the truth, the relation of the flood would have been handed down to posterity; but posterity all over the world speak of it as universal; or allow that there has been a deluge, which comes to the fame thing; for had it been partial or extended only over a few countries, the remaining part of the world would have been utterly ignorant of fuch an event, or at least if they spoke of it, they would not have acknowledged, as they generally do, that it happened in their own country, and have supposed that a king or an eminently righteous person of their own nation (including some others) was preserved from the destruction. All this abundantly proves that the deluge was universal.

THE certainty and universality of the flood appearing thus evident, I shall now, (thirdly), make some observations concerning the Truth, Perfection,

and Divinity of the Mosaic account.

FIRST, as Truth is the purer the nearer to the fountain head, so Moses has the advantage of all other historians in this respect; none can presume to equal him in antiquity; he is allowed by all learned men whatever to have wrote a considerable distance of time before them all.

And as he lived nearer the event than any other writer, so is his relation more full and express; nay, if you take all the above-mentioned heathen accounts together, and collect from them every different part, you cannot exceed the *Mosaic* in fulness of description;

far less can you do this, if you add to it the conside-

ration I have mentioned p. 1.

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And not only in fulness of matter does Moses surpass, but in justness of thought and diction, and in the consistency of the scheme he delivers. In the heathen historians there are many impersections of this kind, some failing in more, some in sewer articles. But Moses the heathen historians there are many impersections of this kind, some failing in more, some in sewer articles. But Moses the he extends the duration of the Deluge far beyond what any of them do, and afferts its Universality in the highest degree, has yet provided against all exigencies; he safely embarks the numerous creatures in the ark, prepares every thing necessary for their being and well-being there, and as safely lands them.

As the heathen accounts differ more or less from the Mosaic, which was confessedly prior to them all, so we may affert of the relaters of them, as Scaliger is said to write of the Greek historians, 'They ought rather to be pitied for not having had the advantage of authentic antiquities and records, to set them right, than to sorfeit their authority for such deviations from the truth of the story, as render their confirmation of the truth of the Sacred History much stronger, because much less to be suspected, than if they agreed with it in every circumstance.' So that the impersect and in many respects salse accounts of the Heathen bear witness to the truth and persection of that of Moses.

But what distinguishes the Mosaic writings, and sets them in an eminently conspicuous light, and intimates their high Antiquity and Divinity, is, that in them there is no reference made, for the truth of what they contain, to any prior traditionary accounts, histories, or records, as is the usual manner with other historians; which kind of proof all mere human writers are glad to embrace, thinking nothing more

venerable and true than that which has been delivered down to them from their forefathers. But Moses, as greatly superior to them in time, so much more in dignity and authority, demands audience from us as from God himself; he refers, for the truth of what he says, to an immediate Inspiration from the Deity, the Author and Disposer of all events; I AM, says he (Exod. iii. 14.) bath sent me, Jehovah Himself commissioned him to act, and a Thus saith the Lord authorised him to write.

And had not Moses been thoroughly persuaded, that he was inspired by God in his writings, he certainly never would have ventured the truth of all he fays upon the affertion of a most improbable and aftonishing fact, viz. That the whole world bad been destroyed by a flood of waters; -a Fact, which he could not by any natural means have had proof of, unless he had travelled all over the world, or had received his information from one that had, which I believe no person will suppose any one to have done in those early ages; -a Fact too, the truth or falsity of which could not but have been discovered, as mankind dispersed to re-people the earth, or as commerce had opened a correspondence throughout;—a Fact also. which Moses, as a human writer, does not appear to have been under any necessity of mentioning at all; or if he thought proper to record it, he might not have made it so extensive as he has done, and yet in all probability have faved his credit as an author. But, instead of all this, conscious of Truth and of the unerring Wisdom of his Inspirer, he openly declares the Universality of the Flood, and that the whole world was destroyed, and leaves the iffue to Providence and the disquisition of the truth of his affertion to future ages.

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But what fets Moses in the highest point of view. and his writings on the firmest foundation, is his exerting supernatural powers, performing MIRACLES2 and delivering PROPHECIES, in proof of his divine Inspiration: some of which are remaining at this day. I shall mention one, respecting the affair of the Delage. Moses writes thus, Gen. ix. 12. And God said, This is the token of the Covenant which I make between me and you, and every living Creature, for PERPETUAL GENE-RATIONS: I do fet my Bow in the Cloud; and it hall come to pass, when I bring a cloud over the earth, that the Bow shall be seen in the cloud: and I will remember my Covenant which is between me and you, and every living creature of all flesh; and the waters shall no more become a flood to destroy all flesh. This Token we see is frequently exhibited, fo that this faithful Witness in beaven is still preserved. No flood has really yet happened (fince that on account of which this promife was made) in which the whole earth has been drowned. Now if there be any God superior to Moses's God, it behoves him to destroy his Prophecy by annihilating the fign of it out of heaven, or the remembrance of it

That these words of the Psalmist (Psal. lxxxix. 37.) are really to be understood of the Rainbow, (and not of the Moon, as usually interpreted) appears to be sufficiently evident from what the Author of An Essay on the proper Lessons, appointed by the Liturgy of the Church

of England, &c. says on this text, Vol. II. p. 87.

That the miracles afferted in the Bible to have been performed by Moses, were really transacted as there related, and of course that the doctrines delivered upon the authority of those miracles are indisputably true or were of divine Inspiration, the Reader may see a regular and succinet proof of in the Rev. Mr. A. S. CATCOTT's Sermans p. 531-48. It wou'd be too tedious to introduce such a proof here, and therefore the Author rells the evidence of Moses's Inspiration upon a Prophecy, relative to the Subject he is treating of, and which is existent at this day, and affords ocular Demonstration of Mafer's Mission from the Divine Being.

out of the mind of man, else it will remain an indubitable proof of Moses's Mission from the Supreme Being, -the Gop of Heaven and Earth, the Creator, Former, and Preserver of all Things in this world .- If it be said, that the Rainbow was existent before the flood; therefore the argument will not fland good. I reply, that supposing it to have been so, it could not have existed as a Sign from the Supreme Being, that a flood of waters should never cover the earth (because such did cover it) and therefore it will not in the least affect the argument here used; which does not respect its bare natural State, but its super-natural use and divine And left it should be imagined, that appointment. Moses assigned this token as of himself, and to shew the folly of fuch imaginations when men prefume to make appearances in heaven figns or tokens of things upon earth, without a divine direction, I shall here quote a Fact recorded by Gaffendus in his Animadverfions on the tenth book of Diogenes Lacrtius, Tom. II. p. 938. 'Memorabile certe est, &c. i. e. It is really worth remarking, what is written in the histories, ' and in almost all the books of the last age: When the Astrologers, by reason of the many great con-'junctions of the Planets, and not a few of them hap-'ning in the watry Constellations foretold, that in the month of February in the year 1524, there would be a general Deluge, and so great a devastation of things, as was never heard of before. So that 'numbers of persons in France, Spain, Italy, and Germany, being terrified with these apprehensions, ' had prepared Ships, or had got together what pro-' visions they could, and other necessaries, and made 'to the highest places: But so it happened, that the ' whole month of February was the most serene and fair weather ever known; apparently, as if it had been so ordered on purpose for resuting the predictions of these Astrologers (when otherwise it is very unufual, that the month of February should be without rain;) which even Cardan and Origan [two noted 'judicial Astrologers of that time | could not deny; greatly grieving that this Judgment concerning the Deluge was declared by Staffer fo much to the in-' famy of Astrology.' As long then as the above Appeal to the true Gop, and Challenge to all false Deities remains, fo long will each fucceeding age have undeniable proof, nay ocular Demonstration of Moses's Mission from, and Inspiration by, the Gob of all truth, power, and wisdom. And when we confider that this bold Appeal has been recorded in writing, already above three thousand years, and no detection yet made that it was false or unauthorised by the true God, we may justly suppose it will remain as long as the Heavens themselves shall endure, i. e. to the Confummation of all things,

And this I think a proper place (before I have quite done with Scripture and ancient History) to take notice of his Lordship's objection to the Universality of the Flood drawn from the peopling of America, and its being inhabited with wild beafts, &c. when we first discovered it. To account for which he supposes, ' that fome parts of the habitable ante-diluvian world, 'which by the force of the Deluge were feparated into 'illands, and were divided from the Continent whereon the Ark landed, were in some fort exempted from 'the common calamity brought upon the rest of the 'world, &c.' But how inconsistent this supposition is with his own description of the Deluge and with the truth of Scripture, I have shewed already (p. 9, &c.); and also observed, that supposing we could not solve this difficulty, yet a feemingly unaccountable event in

Nature (or rather that which may appear unaccountable to some, but not so to others) ought not to set aside the united evidence of Scripture, Reason, and Fact, concurring in all other respects to prove the Point under consideration.

But to shew bow or by what means America became

inhabited by men and other animals.

And here it will be necessary to premise a few things,

introductory to the discussion of this article.

First, then, America was peopled after the Flood. This is certain from the inhabitants thereof having the

knowledge of that Event.

SECONDLY, Since the Tradition of the Flood was univerfally spread throughout that vast tract of land, and acknowledged by the several nations thereof to have been delivered down to them from the highest antiquity, we may reasonably suppose, that it was peopled soon after the deluge; whilst the knowledge of the Fact was fresh and lively upon the minds of the original inhabitants.

AND fince, when this part of the world was first discovered by the Europeans, the inhabitants were found to be ignorant of the art of writing with letters, and could record things only in the ancient bieroglyphical way, by signs and emblems, it seems also hence

evident that it was peopled early.

Which will further appear from their ignorance of the art of working iron into useful tools or warlike weapons, 'till the method was discovered to them by the Spaniards. For tho' there is plenty of iron-ore in America, yet the ancient inhabitants were ignorant of the use which the Asiaties and Europeans make of it; and instead thereof used shells, bones, or generally hard

Purchas's Pilgrimage, p. 811. quoting Acofta, Gomara, Peter Martyr, &c.

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flones, which with immense labour and trouble they shaped by grinding or whetting, into the utenfils or weapons they wanted, And the the art of manufacturing iron, was known before the flood (Gen. iv. 22.4) yet it feems to have been loft foon after; and the loss was probably owing to these two causes; sielt, that as all the metallic and mineral bodies that were in the earth before the Drluge were destroyed and even diffolved during that Catastrophe (as will be shewn hereafter) fo of course all the instruments and utenfits that were made of these bodies perished likewise; which would certainly tend much towards obliterating the memory of fuch instruments in the post-diluvian And fecondly, fince, for fome confiderable time after the flood, the inhabitants of the new earth would be employed and their time wholly taken up in providing and fecuring the common necessaries of life at first hand, or when they came to separate from one another in travelling and feeking out agreeable countries to inhabit, for the art of mining and works ing metals, and fuch like knowledge, (among their cares and concerns for many things immediately needful and absolutely necessary) might be forgotten. And it feems certain that this art was loft, 'till fome time after the flood; for there are found, even at this day, in almost all parts of the world many instruments. fuch as axes, chilely, heads of arrows, &c. confifting wholly of Stone, generally of the hardest kind, which certainly were made before the use of iron was reco-

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CDr. WOODWARD'S Letters, relating to the method of Fossils;

and Zillah, she also bare Tubal-card, an instructor of every artister in brass and iron. From this person's Name and Office was derived the sictious Vul-can of the Latins.

[.] Woodward's Letters.

vered after the deluge, for they are neglected and difused wherever iron is known. And since when we first discovered the Americans they had no other tools or weapons but such as were formed out of Stone, &c. it is evident, that they departed from us before the working of iron was in practice after the Flood; for had they ever known this useful art, it is not probable that they would ever have lost it, any more than ourselves; and since we have retained it for these several ages back, even from time immemorial, it is certain that the Americans departed from us even be-

fore that early time.

ANOTHER Confideration which may be brought in favour of the early peopling of America, is, that the inhabitants were ignorant of that noble and useful Structure the Arch, and even of building with mortar or any kind of Cement; and yet their edifices confifted of Stones great beyond imagination, and thefe Stones were fo artificially wrought, and placed upon one another, that in many places their joinings were not visible: 'And that which is most strange (fays " Acofta), these Stones not being cut nor squared to 'join, but contrariwise very unequal one with another both in form and greatness, yet did they join them ' together without cement, after an incredible manner; all this was done by the force of men, who endured their labour with an invincible patience.' Certainly if they had known the use of mortar or cement, they would never have taken fuch a tedious method as Now the first post-diluvian account we have of Cement being used in building was at the Tower of

See Acosta's History of the Indies, Book vi. chap. 14.

^{*} Acofla measured one of these Stones in a building, and it was 38 feet long, 18 broad, and 6 thick; which I think, vastly exceeds any of those that are now remaining in our ancient Druidical Temples.

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Babel (Gen. xi.); but as this in all probability was that pitchy substance, called Asphaltus, with which that Country particularly abounds, so unless the Americans had discovered a substance of a similar nature in their new land, they might not think of making use of any other, and be as much at a loss for what we now call mortar as if they had never heard of any thing like it. So that indeed we cannot conclude from hence that they departed from us before the Building of Babel but only before the general use of Mortar or Cement; and even this was very early, as the remains of the oldest Buildings in the world such as the Pyramids of Egypt &c. testify, in which the mortar is visible at this day.

The last circumstance I shall mention, tending to prove the Antiquity of the American Colonies (for I might enlarge upon several, as their ignorance of coined money, the plough, the bellows, &c. all which would serve to shew that they departed from us in the very infancy of the post-diluvian world, before these arts were known to mankind) is, that they were ignorant of Shipping or the art of making large vessels with Sails &c. till they first saw ours; knowing before no other kind of vessels than small boats, made of the bark of trees, skins of sishes, &c. or canoes, consisting of a single trunk of a tree hollowed out by means of fire, and these to be directed only by the help of oars or a paddle. From whence I would

THIRDLY observe, that America must have been peopled by land: for had the original inhabitants been carried thither in a Ship, either by distress of weather or designedly (both which are suppositions

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h Dr. Shaw's Travels, p. 415.

PURCHAS's Pilgrimage, p.. 750, 755 &c. HEYLYN's Cosmographie, p. 1016.

that can scarcely be allowed when we consider the difficulties attending them) they certainly would never have forgot that useful part of shipping, the Sail; even supposing that fabricating a large vessel might be inconvenient or impossible to them when they first arrived on their new land, and therefore the knowledge of it be lost to their posterity; yet, I say, the use of the Sail would in all probability have remained among them, since it would have been of such service

in navigating their small canoes.

But what feems most to confirm the opinion, that America was peopled, or at least stocked with animals, by land, is, that that vast Continent is every where inhabited by wild beafts and the most noxious creatures, fuch as Lions, Tygers, Rattle-Inakes, &c. which we cannot imagine that any perfons would be at the trouble, or expose themselves to the danger, of conveying over thither in Ships, and at the fame time leave behind them such useful creatures as the Horse, the Camel, &c. which were not known in the West-Indies 'till transported thither from us.k what is most remarkable. America has creatures peculiar to itself, such at least as are not known to exist in any other part of the world; which therefore cannot be supposed to have been carried from hence thither: and besides they are of such a nature that of themselves they could not have croffed the Seas, and therefore must have come thither by land.k

In appearing then thus clear that America was peopled early and by land, the next question to be solved

is, by whom or from what land?

In order to folve which, Let it be observed, that the sacred and most ancient Historian informs us, in his account of mankind after the flood, that the whole earth

^{*} PURCHAS p. 732-35. HEYLYH, p. 1017-19.

was averspread by the descendents of the three Sons of Noah,
—Shem, Ham and Japhet, who went forth of the Ark.
Gen. ix. 19. From whence it is certain, that no part
of the world could have been peopled by any other
anti-diluvians than those that went out of the Ark;
and of course that America was peopled after the Flood,

and by the Posterity of Noah.

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SECONDLY, Let us confider, that Moses proceeds next to give us the names of the first descendents of these three Sons, and to mention the names of the Countries which the principal of them inhabited, especially those whose affairs would afterwards be mixed, or have some connection, with the Transactions related in the Bible, particularly with the Israelitish Nation. But as for the rest he takes little or no notice of them.

So that, Thirdly, we cannot expect that any great notice should be taken of the inhabitants of so distant a part of the world (from that where Moses wrote, and the intent of his writing) as the Continent of America; and yet, one would be apt to imagine, that as He, who inspired Moses in his account, saw all things from the beginning to the end (and who had made of one blood all nations of men for to dwell on all the face of the earth, and had determined the times before appointed, and the bounds of their habitation, Acts xvii. 26.) so He would, in speaking of the migration of mankind towards re-peopling the earth, make some mention, let drop some sew words concerning the manner by which so large a part of the world, as the Continent of America, became inhabited.

AND such there is reason to think he has done, and lest recorded in the following remarkable passage (the event denoted by which, was so singular as to give name to one of the post-diluvian Patriarchs; and is twice repeated in Scripture) viz. Gen. x. 25. 1 Chron.

i. 19. And the name of one (of Heber's sons) was Peled. for in bis days was the earth DIVIDED [NePeleGE] On which words, that celebrated Biblical Critic Bengelius thus occasionally remarks in his Ordo Temporum, p. 54. · Peleg a divisione terræ nominatus est, &c. i. e. Peleg was named from the division of the earth [which happened in bis days; - The earth after the deluge was divided by degrees, by a genealogical and political ' division, which is expressed by the words מנפצה and But a very different kind of Division is meant by the word [NePeLeGE], namely, a phy-'fical and geographical division, which happened at once, and which was fo remarkable, and of fuch extent, as fuitably to answer the naming the Patriarch therefrom. By this word [PeLeG] that kind of Divifion is principally denoted, which is applicable to Land and Water. From whence in the Hebrew fongue 152 [PeLec] fignifies a River, and in the Greek ' ΠΕΛΑΓΟΣ [PELAGOS] the Sea;' [and in the Latin, Pelagus denotes the same]. From this precise meaning of the word then we may conclude, that the Earth was split or divided asunder for a very great extent, and the Sea came between, in the days of Peleg. Now furely when any person views the situation of America, and confiders how it stands disjoined from this part of the world, and what an immense Sea divides it from us, he will not be backward in allowing, that This was the grand Division intended by the Passage under And therefore we may justly suppose confideration.

* As Gen. ix. 19. These are the three Sons of Noah: and of them was the whole earth OVERSPREAD [TYD].

¹ As Gen. x. 5. By these were the islands of the Gentiles DIVIDED [177] in their lands; every one after his tongue, after their samilies, in their nations; so also ver. 18, and 32; and ch. xl. 9. From thence [from Babel] did the Lord SCATTER THEM ABROAD [DY 97] upon the face of all the earth.

with the above-mentioned writer, 'That, foon af'ter the Confusion of tongues and the dispersion of
'mankind upon the face of the whole earth, some of
'the sons of Ham' [to whom Africa was allotted] went
'out of Africa into that part of America, which now
'looks towards Africa; and the earth being divided or
'split asunder in the days of Peleg, they with their pos'terity (the Americans) were for many ages separated
'from the rest of mankind. This separation of the
'human race, by means of so large a sea, prevented
'in like manner any evil and pernicious conspiracy,

'as the Confusion of tongues did.'

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And if this account can be seconded by any similar event related in ancient Heathen History, our suppofition may deserve a greater degree of credit. And fuch an event we have recorded by Plato in his Dialogue named Timæus; in which he treats of Nature or the System of the Universe, its generation or beginning, and the Nature of Man. And as a prelude to his Subject he makes mention of a Fact that happened in the most early ages, the nearest of any known to the beginning of the world; and that is of a vast Tract of land or an Island greater than Libya and Asia, situated beyond the bounds of Africa and Europe, which, by the cuncuffion of an earthquake, was swallowed up in the Ocean. Plato introduceth this fact, as related by Solon (one of the first of the seven wise men of Greece) who, while he was in Egypt, had heard it of an old Egyptian Priest, when he discoursed with him concerning the most ancient events. This Priest tells Solon, that the Greeks, with regard to their knowledge in antiquity, had always been children; and then informs him of the history of this famous Island (which they knew nothing

m From what the *Indian* fays to the *Spaniard*, p. 72, it appears, that the *Americans* themselves retained some kind of tradition that they were descended from this Son of *Noah*.

of before). The description of which and its cataftophre is as follows (which in itself is so remarkable, that there must have been some ground in nature for the tradition of it), 'There was formerly an Island at the entrance of the Ocean, where the pillars of Hercales frand fand fo beyond the then supposed bounds of Europe and Africa]. This island was larger than all Libra and Afia; and from it was an easy paffage to many other islands; and from these islands to all . that Continent which was opposite, and next to the true fea [andirov movion]. Yet within the mouth, there was a gulf, with a narrow entry. But that Land, which surrounded the Sea called Mexagos [PE-LACOS, where the Division was made | might justly · be called a Continent. In after-times there happened a dreadful earthquake and an inundation of water, which continued for the space of a whole day and night, and this island Atlantis, being covered and overwhelmed by the waves, funk beneath the ocean, and so disappeared: Wherefore that Sea | Hi-· hayes is now unpassable, on account of the slime and "mud that has been left by the immersed island."

This passage of Plato may receive some illustration, and the point I am upon, some degree of confirmation, from what occurs in the 18th ch. of the third book of Peran's History of various things. Theopompus relates a certain discourse that passed between Midas the Phrygian and Silonus. This Silonus was the son of a Nymph, and was inferior to the Gods, but superior to mortals. When these two had discoursed of many things, Silonus, above all, tells Midas, That Europe, Asia, and Libya, ought to be considered as Midas, which the Ocean wholly surrounded; and that that part of the world, which lay beyond this, ought only to be esteemed the Continent: as it was of an immense extent, and nourished very different,

" and vaftly larger, kinds of animals than this fide of the world; and the men, that inhabited it, were

" twice as big."

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From what has been offered, I think, we may conclude, that Africa and America were once joined, or at least separated from each other but by a very narrow gulf; and that some time after the Flood the earth was divided or parted asunder, probably by means of an earthquake, and then this middle land sunk beneath the Ocean.

According to Scripture this event came to pass in the days of Peleg, for we are told, that in his days the earth was divided. From whence some have imagined, that this division fell out exactly at the time of his birth; but the extensive expression of his days rather implies the contrary, and denotes that it happened when he was in an advanced age, when he had seen many days, not when he had seen but one. So that his name must have been given him prophetically, in the same manner as was Noah's, under which was predicted an event which did not come to pass 'till some hundreds of years after his birth (Gen. v. 29. viii. 21). Several other of the Patriarchs also had such prophetical names.

Now it appears from Gen. xi. 10—17. that Peleg was born in the 101st year after the flood, and lived 239 years: so that if the circumstance that caused his name to be given him, happened, when he was in an advanced age, we may fairly suppose that it sell out

about 300 years after the flood.

ALLOWING this distance of time, we shall find upon calculation, that there must have been a sufficient
number of mankind upon the earth to have re-peopled
it abundantly. In order to shew this, and also
in what manner the post-diluvians may be justly supposed, even in a natural way, to have separated and

dispersed, and re-peopled the globe, I shall transcribe fome lines from the Abridgment of PICART's religious Ceremonies, p. 279. 'Tis very probable, that Ameri-· ca was as populous a few centuries after the deluge as it is at this time; after which States and Kingdoms were foon formed: However this was done ' progressionally, according as Families separated, and that the children themselves becoming Parents of a ' numerous progeny, were obliged to quit their na-These Separations gave rise to ' tive countries. States, in which ambition and a defire of fuperiority ' might even in those ages have had some share. " vertheless 'tis probable that Afia did not fend out any colonies, 'till after having been forced to drive out * fuch young people as were capable of fublifting by But these Settlements were very easily ' themselves. " made in those times: Husbandry was then the only employment; mankind then spent their lives in lead-'ing their flocks to pasture; and 'tis by the opportu-'nities which rural occupations gave to people whose · passions were as yet but in their infancy, that the · first conquests were made in Asia, and the sending out of the first Colonies. A Shepherd, who was at the head of a numerous family, mafter of feveral · flocks, and who found himself well settled in Chaldea. fent one of his Children or Dependents, feveral · leagues off, with a detachment of oxen, affes and camels. The flock went gently on, grazing in their ' passage, and insensibly drew farther from the true In the mean time the Detachment grew more owner. 'numerous; from this flock there fprung another. 'The Shepherd, who at first was no more than a de-' puty, became himself the Master and Father of a family: He then also separated part of his wealth, and gave it as an inheritance to that Son whom he intended should settle in a foreign country, or to

fome dependent that was going to fettle further off. We prefume that in this manner an hundred years was time sufficient to people Europe, Asia, and Africa, very confiderably; and an hundred more to peoople the Continent of America. Let us suppose for this purpose, that at the flood Shem, Ham, and 7abet had each 12 children," and that all these children were fit for marriage about 15 or 18 years af-'ter the flood. 'Tis very probable, that after they 'had been married 12 years, they might fee a posterity of four hundred and thirty-two persons. In this ' manner Noah might have been at the head of above ' five hundred descendents in the space of thirty years; ' and if we then suppose that every one of Noah's great 'grand-children had ten children, these four hundred 'thirty two persons might have begot four thousand ' three hundred and twenty children in ten years time. 'All this might have happened in the space of half a 'century; fo that multiplying them always by ten, ' and leaving an interval of about twenty or twenty-

[&]quot; Lest the subsequent Calculation should seem unreasonable, the reader is defired to attend to the following, which is founded upon a Scripture-matter of fact, ' It is evident from facred History, [Exod. ' xii. 37.] that in the space of about 266 years, the posterity of ' Jacob alone, by his [twelve] fons, amounted to fix hundred thou-' fand males above the age of twenty, all able to go forth to war. Now by Mr. Graunt's observations on the bills of Mortality it appears that about $\frac{34}{300}$ are between the ages of fixteen and fifty-fix: which may be near the proportion of males numbered, to the entire number of them all. So that as 34 is to 100, by the Golden Rule, must fix bundred thousand be to the entire number of the ' males of Israel at that time: which was therefore one million seven bundred fixty-four thousand and seven hundred. To which add fe-" males, near t, fewer, as suppose, to make the sum even, one mil-' lion fix bundred thirty-five thousand three bundred, the Total is, Three millions and four hundred thousand; add forty-three thousand ' for the Levites (not included in the former accounts), the entire fum will at last amount to three millions, and four hundred forty three thousand souls.' Whiston's Theory, p. 250.

· five years between one generation and another, Afia, Europe, and Africa may have been peopled with four bundred thirty-two millions of inhabitants, an hundred and fifty years after the flood. Methinks this could not be disputed, were we only to have regard to the ordinary methods of propagation. 'Tis true indeed, that we suppose every Head of a family to have had ten children, when probably several of those Chiefs might not have had near fo many. But then how many do we see in our days who have more than ten; and if we consider what Bp. Burnet has told us concerning Meff. Tronchin and Calandrin of Geneva: "the former of whom at the age of feventy five, had " one hundred and fifteen children, or persons married " to his children, that could call him Father; and the " other, at the age of forty feven, had one hundred "and five persons who were all his nephews or "nieces by his brothers or fifters." If, I fay, we consider these two instances, 'twill be found that our computation is modest enough, for an age when poverty and the cares of life had not yet destroyed man's vigour, nor reduced him to the * necessity of refraining from marriage (the lawful 'method of propagation) for fear of not being able to support his family. But although the increase of our species had for one hundred and fifty years been much less than we have supposed it, and that only four bundred millions of people had came into the world; nay farther, tho' we were still to substract thirty millions from * that fum, for the immature and violent deaths, diseases and wars, which in all probability were 'not so bloody in those ages as they have been fince, 'tis very natural to think that some millions * might detach themselves from the remaining three bundred and seventy millions in order to seek their

fortunes in America. And tho' we afterwards sup-'pose, that propagation may have been very much prejudiced by reason of the fatigues they laboured under in their voyage, and from the change of 'climate, &c. we shall nevertheless find that ten or twelve millions of people may have been able 'to furnish America with forty millions of souls, in fifty years time. What is here advanced ought 'not to be looked upon as a paradox, nor should 'any difficulties be raised with respect to our cal-'culation; difficulties which are founded only on 'the length of man's life in our days. Mankind in those ages had not invented all those pernicious arts, 'which at the fame time that they shorten life, do also 'lessen propagation.' And if to all this we add the consideration of what we are told in Gen. ix. 1. viz. That God, immediately after the deluge, bleffed Noah and his sons; and said unto them, Be fruitful and multiply and replenish the earth; if, I say, we add to the above observations the consideration of this divine Bleffing, and injunction, we cannot doubt that the Progeny of Noah and his Sons was very much increased foon after the Flood, and fufficiently numerous to re-And, when we farther consider, people the earth. that after the Confusion of Babel (which happened about an hundred years after the deluge) it is faid, Gen. xi. 9. And from thence did the Lord scatter them [i. e. the Projectors of Babel abroad upon the face of the whole earth; I fay when we consider this, that those who were reluctant to Gop's design were forced to go, and doubtless many co-operated with the divine intention willingly, and as mankind, within two or three hundred years after the flood, were abundantly fufficient for re-peopling the whole earth, fo we may fairly conclude, that within that space of time they actually peopled it.

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WITH regard to the brute part of the world, they certainly complied with the divine injunction, Gen. viii. 17. and were fruitful, multiplied upon the earth, and And with respect to their dispersion, bred abundantly. their peculiar qualities and inftincts would prompt them to feek fuch countries and climates as would be most suitable to their natures; in the same manner as many of them now pass from one country to another, to immense distances, when the alteration of the sea-Add to this, that the mild and fon affects them. meek kind of animals, fuch especially as were designed to be the prey of others, would naturally avoid the wild and rapacious, and the last would as naturally purfue; fo that both would be induced to get as far from the place where the ark landed, as they conveniently could: and by this means the whole globe would be foon re-fupplied with animals.

Thus then, within two or three hundred years after the Deluge, the whole Earth would be re-peopled with men, and stocked with other animals. about this time the Earth was divided or split asunder, and we may justly suppose that the land, which united Africa and America together, suffered in this division, was disjoined from the two Continents, and funk beneath the Ocean; - so would both Continents be still inhabited; tho' for the time forward the inhabitants

of each would be separated from the other.

Thus we have discovered an easy way by which America might have been, and I apprehend, the true way, by which it really was supplied with inhabitants after the flood; a way this, that affords a very convenient passage (thro' a warm and fruitful climate) for the most tender and delicate animals, and such as could not endure any great degree of Cold, and of

course a very easy one for robust man.

NATURAL PROOFS

OF THE

Scripture Account of the Deluge,

Deduced from a great variety of circumstances, on and in the terraqueous globe.

AM now come to lay before the reader what natural proofs may be deduced, from the present situation of things in the earth, in favour of the Mosaic defeription of the Deluge.

AND here, I shall select four Particulars, which if I can evince, the truth of the whole will, I believe,

be readily admitted, viz. if I can prove,-

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I. That there is a quantity of water in the earth abundantly sufficient for slooding it to the height represented in Scripture;

II. THAT this water did actually thus overflow it; III. THAT, during this Flood, the folid structure or compages of the earth was dissolved, all the minetal and metallic matter reduced to its original corpus-

ral and metallic matter reduced to its original corpufcles, and affumed up into the water; fo that the whole constituted one fluid mass or colluvies;

IV. That all this matter, together with the animal and vegetable bodies inclosed within it, subsided again, and formed the present solid strata of the earth.

IF, I say, I can prove these four points, the truth of the Mosaic description of the Flood cannot, I think, well be disputed.

And I. to shew, That there is a sufficient quantity of water in the earth for covering all the high mountains under the whole heaven, or rather the whole surface of the Earth above the height of the highest mountains.

This has been thought the main and principal hinge on which the whole affair of the Deluge turns, the Caula fine qua non of folving that grand catastrophe; for unless we can procure sufficient materials for the work, it would be idle to attempt the follution of the effect. And all nature, both from above and from below, has been ranfacked by feveral writers on this subject to find out a place where there lies a quantity of water sufficient for flooding the earth; which, considering the light that writers in general have looked upon the deluge in, namely as a flood of waters barely overflowing the terrestrial parts of the globe, is a matter of some surprize that they should be at a loss to find a fuitable quantity: for let any one but cast his eye over a map or globe of the earth, and he will at once perceive that the Ocean and Seas greatly exceed the terrestrial parts, and if he will take a nearer and more accurate furvey and add to the account the fpaces occupied by all the rivers and lakes upon the earth, he will find, that the dry land comprehends not more than, if so much as, one third part of the earth's furface. And as it is well known, that the sea is unfathomable in many places, and that its depth is equal to the height of the mountains; of it is evident, and manifest to sense, that there is a quantity

^{*} See Varenius's Geography, by Shaw, Vol. I. p. 123, 195, 8. As I shall have occasion to quote this Treatise hereafter, it may not be amiss to acquaint the reader with its authority and character. Sir Isaac Newton thought it so judicious and useful a work, that he reprinted an accurate latin edition of it at Cambridge, for the use of the Students in that University. This edition meeting with a quick sale,

of water in the earth capable of covering all the high mountains under the whole heaven. But as this act of barely covering the mountains will not answer the description of the Flood as given in Scripture, nor suit with the effects of that Flood as they are now discernible upon and in the earth (of which hereafter) so we must find out a quantity, even greater than this. But what I have said may serve to pave the way, and lessen the wonder the reader may conceive concerning the quantity of water requisite for such a grand transaction.

THE Prelude to which mighty event was, according to Moses, The breaking up of the fountains of the Great Deep. What this Great Deep or Abys is has been shewn already, namely, that it is an immensely large Reservoir of water lying beneath the circular shell of the earth, communicating with all lesser Deeps or Seas, and affording supplies for the numerous rivers upon the earth. Such is the Scriptural account

of this Abyss, see p. 25, &c.

LET us now see what reason there is to believe, from a view of the structure and parts of this globe, that there is such a subterraneous magazine of water.

I. The first argument which I shall bring in proof of this Abyss is (to speak in the words of Scripture wherever we can) That all the rivers run into the Sea, and yet the Sea is not full, or does not reach the height

and confequently soon becoming scarce, Dr. Bentley importuned Dr. Jurin to print another edition, and to affix an appendix of later Discoveries. Mr. Dugdale published an english Translation from Jurin's edition, with several additional notes; which has since been revised, corrected and re published by Dr. Shaw. And I scarce know a more useful Book for a Student in Philosophy to begin with.

See also Histoire Physique de la mer par Comte de MARSILLI, p. 11. This also is a valuable Treatise, and the Author of it so well known for his indefatigable industry, judgment and accuracy in making experiments and observations upon the tops of the highest mountains, the deepest caves, and even the bottom of the Sea, that I need only

to mention his name to gain credit to his book.

of, or run over, its shores. This is a fact as surprising as it is apparent; but, like other common truths, the obviousness of it lessens the wonder, and takes off the weighty confiderations deducible therefrom. But the Event in itself is truly wonderful, and deserves our particular notice on the prefent occasion. merate and describe all the rivers upon the earth would be endless and impossible. I shall therefore mention some of the largest; in order that we may form a judgment of the quantity of water poured into the Sea by all of them. The Danube, after it has ran a course of above two thousand miles, and received by the way fixty rivers, (thirty of which are fo large as to be navigable) throws itself, by five or fix great streams, with fuch rapidity into the Euxine Sea, that its water continues fresh and unmixt with the falt for twenty leagues. Its depth, in most places, is two bundred feet. The Volga, after it has taken an irregular tour of two thousand nine bundred miles, and increased its stream by the addition of two hundred rivers and brooks, discharges itself by twenty five mouths into the Caspian Sea, and makes that Sea less brackish for many leagues. The Oby, a river in Siberia, in some places half a league, and in others a whole league broad, runs for about two thousand four hundred miles (without reckoning its windings) and then empties itfelf by fix mouths into the Icy Sea. To which we may add the Jenisa, about ten weeks journey distant from the former river, and equal, if not superior to it, both in length and breadth. The Croccaus or vellow river of China, after having flowed thro' feveral Provinces for more than two thousand miles, falls at length

Didionary.

Atlas Geographus, Vol. I. p. 164. Varenius, p. 291.

Atlas Geog. p. 165. VARENIUS's Geography, Vol. I. p. 349.

Varenius, ibid.

into the East-Sea. Not far from this is the Kiam, remarkable for its depth, being unfathomable in feveral places, fo that the Chinese have a proverb among them which fays, The Sea bath no bounds and the Kiam bath This impetuous river (which is fo very no bottom. rapid when the torrents from the mountains increase its stream, that it frequently bears away the islands that lye in its channel, and buries them under its waves) after having ran a course of twelve bundred miles, disburthens itself into the East-Sea of China." The Ganges, famous for its length, breadth and depth, being near fifteen bundred miles long; and in its narrowest places eight miles broad, in the most open parts twenty; and feldom so shallow but that its depth meafures an bundred feet. The Euphrates, after having ran a course of about a thousand miles joins that remarkably rapid river the Tigris (after the Tigris had paffed) a course of about five bundred miles) and both of them, about fixty miles beyond their union, exonerate themfelves into the Persian Gulph. The Nile takes its rife in 12 deg. of N. Lat. and having flowed fifteen bundred miles, nearly from South to North, divides into two branches, and then falls into the Mediterranean Sea.x The Niger, the longest river in Africa, after a course of two thousand four hundred miles, empties itfelf by fix great streams into the Atlantic Ocean.y The Zaire, another river in Africa, which, though it does not equal any of the above in the length of its courfe, yet exceeds them all in its breadth, being at

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" Ibid.

* SALMON's present flate of all nations, Vol. V. p. 10.

VARENIUS, p. 349. COLLIER'S Dia.

^{*} LE COMTE'S Observations made in a Journey thro' the Empire of China, p. 108.

[&]quot; SALMON'S modern Gazetteer: HEYLYN'S Cosmography, p. 879.

its mouth twenty eight miles broad, and rushes into the Ethiopic Sea with so great a force, as to preserve its waters pure and fresh for ten miles commonly, for fifteen at other times. But if we pass into America, we shall find rivers exceeding any yet mentioned. The river of St. Laurence, after having ran through, and been fed by, feveral great Lakes, and taken a course of one thousand five bundred miles (and its source yet unknown) discharges itself into the gulph of St. Laurence; being at its mouth between seventy and eighty miles broad, and two bundred fathoms deep. The Paria or Oronoque is navigable for a thousand miles by ships of burden, and two thousand by boats and pinnaces; and having received into its channel an bundred rivers, openeth into the fea with fixteen mouths, which part the earth into fo many islands. b Rio de la Plata, in length from its first fountain two thousand miles, in breadth at its fall into the Sea fixty miles; and of so violent a stream that the Sea for many leagues together altereth not the taste of it. The River of the Amazons, esteemed the greatest in the world; Orellana is reported to have failed in it five thousand miles, including the feveral turnings and windings he took; in many places it is so deep as to be unfathomable; and, at the time of its highest risings, the Current is an bundred and eighty miles broad, and rushes into the Sea with such impetuolity as to preserve its natural taste and colour for more than thirty miles.4 Now to the above let any one make an addition of all the remaining rivers upon the earth, and then conceive within himself

* COLLIER'S Dia.

· Ibid.

^{*} HEYLYN's Cosmog. p. 989, 995.

[·] HEYLYN's Cosmography, p. 1056.

[!] Ibid. Cooki's Voyage to the South Sea, &c. p. 254.

what an immense profusion of water must be poured into the Ocean, I need not fay, yearly, monthly, but daily, or even bourly?—It was the opinion of that accurate Geographer Varenius, fand to which I believe. every one upon mature confideration will confent, as Bo. Stilling fleet, Dr. Plot, Stackbouse, and others have done] that each of the larger fort of rivers, (and fuch, every one of those that I have mentioned above, may well be esteemed, and many others that are not mentioned) empties into the Sea, in one year's time, a quantity of water sufficient to cover the whole surface of the earth. And if several rivers, fingly confidered, throw in fuch a quantity, and fome of them a far greater, What must all of them added together effund? -- In order to fee what a quantity this would amount to, and to what an height, if it was poured upon the earth, it would arise, Let us suppose, that the mouths of all the rivers, or the places where they enter into the Sea, were stopped and dammed up fo high, that their currents were diverted from rushing into the fea, and turned back upon the dry-land; and how foon would the highest mountains be covered?— For, if one river, in one year's time, produces a quantity sufficient to effect this, (or rather twice as much as would be fufficient, for the Dry-land occupies but one third part of the earth's furface) and there are many fuch rivers, and feveral much larger, and if all the leffer streams were united, they would exceed the larger already mentioned, How foon, I fay, in this case, must the highest mountains be covered? Surely, not many days, if bours, would be requifite for fuch an inundation.——Now when we confider, that fuch an inconceivably great quantity of water is daily, or at

[·] Gen. Geography, p. 299.

not full, nor even any visible increase produced thereby, What an immensely large receptacle must there be beneath the Ocean and the Land for containing such an assemblage of water? Well might it be called in Scripture The GREAT DEEP, as all lesser Deeps

or Seas are nothing in comparison to it.

ALLOWANCE indeed must be made in the above calculation, for the quantity of water that is raifed from the Ocean in vapour by the heat of the fun, &c. which some have been so extravagant as to imagine to be equal to That which is poured into the Ocean by all the rivers upon earth; and therefore they suppose, that what the Sea gets by the rivers, it loses by evaporation; and fo a mutual and equable interchange is preserved. But surely this Hypothesis can never stand the examination of common sense or experiments. For if. it is well known, that the vapours and rain fall upon the Sea, as well as upon the land; and the surface of the Ocean is full as large again as That of the Dry-land; so we may justly suppose that two thirds of what is raifed in vapour returns from whence it came, without falling upon the Dry-land. 2dly. Besides, as, it has been observed 'This is a · Summer reason, and would pass very ill in winter, especially in our Northern climate, when the hear of the Sun is much less powerful; and yet our Seas have no fuch fenfible diminution in Summer, or overflowing in winter, as might be expected, if their increase and decrease depended so much upon vapours. And, adly. I may add too, This is a day reason, and will not hold in the night; when the vapours frequently fall nearly as fast as they rose in the precedent day. But, 4thly. fince the favourers of this hypothesis suppose, That the supply of all the rivers upon earth is owing to the vapours that are raifed from the

Sea, carried from thence by wind, and condenfed against the sides of mountains, and so trickling down thro' the crannies of the rocks, enter into the hollow places thereof, form collections of water, &c. from whence they iffue out at the first orifice they can find, and by this means constitute Springs and Rivers; since, I fay, they hold this hypothesis as a consequence of the former, it should follow, That as the evaporations are greater in Summer time than in Winter, fo the Springs and Rivers, which depend upon the quantity of these evaporations, ought to be higher and fuller in Summer than in Winter; the contrary to which is well known to be fact, at least in our Northern regions; unless when the vapours happen to be congealed and frozen into Snow, as foon as they fall; and then they of course (in their frozen and confined state) cannot afford any supply for the augmentation of rivers; and in this case, or in such places where this happens, the rivers generally remain of the same beight in Winter as in Summer. Which last consideration will furnish another argument against the opinion of those who ascribe the origin of Springs and Rivers to the condensation of vapours against the sides of mountains, &c. for it is observed by Mr. Ray, (who himself travelled over the Alps) 'That the tops of the Alps above ' the fountains of four of the greatest rivers in Europe, ' the Rhine, the Rhosne, the Danube, and the Po, are ' for about fix months in the year constantly covered with "Snow to a great thickness; so that there are no vapour's 'all that while that can touch those mountains, and be by them condenfed into water: there falls nothing ' there but Snow; and that continuing all that while on the ground without dissolution, hinders all access of 'vapours to the earth, if any rose, or were by winds ' carried fo high in that form, as I am confident there ' are not. And yet for all that do not those Springs

fail, but continue to run all winter, and it is likely 'too, without diminution.' But, Lastly, this Hypothefis—that the origin of Springs and Rivers is owing to vapours condensed into water and rain, and that the quantity of water which is evaporated from the Ocean is equal to that which is poured into it by all the rivers upon the earth,—has been fo fully examined and confuted by Dr. Gualtieri in answer to Dr. Valisnieri (who maintained the above hypothesis) and this too, by making the most reasonable or rather overreasonable allowances to the favourers of this hypothefis, That I shall only transcribe part of what Dr. Gualtieri has faid on this head, as it is abridged in the Memoirs of Literature for Aug. 1725. After this, Dr. Gualtieri undertakes to prove the impossibility of · ascribing the origin of Springs and rivers to rainwater, &c. To demonstrate this impossibility, 'it ought to be proved that the quantity of rain-water is far from being sufficient to keep up the continual course of springs and rivers. And to set that pro-'position in its full light, one must determine by a · calculation the quantity of rain-water, and the quantity of the water of those rivers that fall into the sea: ' and if one exceeds the other confiderably, the 'quef-It refults (fays the Author) ' tion will be decided. ' from the observations made by the Paris-Academy, ' for the space of nineteen years, that the mean quantity of rain, that falls at Paris, is about 18 or 19 inches 'high every year.' To find how much it rains in

It may be proper to make a few remarks here, 1st. That it has been now determined by a course of observations that have been successively continued by the Professors of the Academy for no less than stiry sive years, that at a medium, or one year with another, there falls no more than 16 inches, and 8 lines of rain; see Templeman's Extracts from the memoirs of the Academy at Paris, Vol. II p. 327; just printed. 241y. That under the term Rain is also included all the

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· Italy during one year, the Author requires that the whole furface of that country be reduced to an ob-'long rectangular parallelogram; the length whereof be of 600 miles of Bologna, and the breadth of 120. In the next place, he supposes that all the water fall-'ing upon that extent of ground, in the space of one vear, is kept in, without being able to run out. 'That water, in this supposition, will rife, according to the observations of the Academy, to the height of one foot and a balf; and if the whole be calculated. it will appear to amount to the fum of two trillions, 'feven hundred billions of cube feet of water, that fall in one year upon the furface of all Italy. Now, 'in order to know the quantity of water carried into the fea by all the rivers of that country in one year, we must suppose a canal of a depth and breadth pro-'portionable to the dimensions of those rivers, whereof those that fall into the sea, are two hundred in ' number, without reckoning the other rivers, brooks, 'fountains, subterraneous canals, &c. Dr. Gualtieri, before he determines the length and breadth of fuch 'a canal, observes that the Po is near a mile broad at 'its entrance into the sea. If we add to the waters of ' the Po those of eighteen other great rivers, can we al-'low to a canal that should contain them all, less than one mile or 5000 feet in breadth, and 20 feet in 'depth? If we add still the water of the small rivers, 'and of all the fountains and springs, that fall into 'the fea; Can any one believe that those waters col-'lected can be contained in such a canal? [Doubtless

water that falls in *fnow*, *dew*, *wapours*, &c. 3⁴¹. That this quantity is measured almost as soon as it falls, and the sum total determined from these several lesser measurements; and no allowance made for what would otherwise have been carried off by *winds*, by *exhalation*, consumed in *wegetation*, *imbibed by the earth*, &c; which, if taken into the account, would greatly lessen the above estimate.

. not]. However the Author is willing to reduce the . breadth of that canal to that of 1250 feet, which is only the fourth part of 5000, and its depth to that of 15 feet. [This certainly is an over-reasonable allowance given to his adversary]. After this re-· duction, the author following the calculation of · Dr. Guglielmini, finds that the quantity of water con-· tinually carried into the fea by a canal of that dimension, during 366 days, would be equal to the · fum of five trillions, five hundred twenty two billions. three hundred ninety one millions of cube feet of water. But all the rain-water, that falls in Italy during one year, amounts only to the quantity of · two trillions, feven hundred billions of cube feet of water. Therefore all the rivers in Italy carry into the fea two trillions, eight bundred twenty two billions, . three bundred ninety one millions of cube feet of water ABOVE that which the rain affords in one year. From whence comes that overplus, if it be not from the · fea itself [or rather from the Abyss that lieth within the earth ? The Author confirms this proof by another fort of supputation, viz. by that of the quantity of water, which evaporates daily. 'Tis well known, (fays he) by feveral experiments, that from a furface of water ten inches square, a cube 'inch of water evaporates in 24 hours. A square ' mile of water contains twenty five millions of fquare feet of water, which make three billions, fix hundred ' millions of square inches: from whence it follows that from a furface of a square mile, three hundred fixty millions of cube inches of water evaporate in '24 hours, which make 208 thousand, 333 cube feet. Allowing the Mediterranean Sea to be 3000 miles · long and 420 miles broad, its whole furface will be of one million, 260000 square miles, which number being multiplied by that of 208 thousand, 333 cube the

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feet, we shall have the number of 262 billions, 499 'millions, 580 thousand cube feet of water, which in 24 hours evaporate from the whole furface of the 'Mediterranean sea; and multiplying again that number by that of 365 days, there will be 95 trillions, 812 billions, 346 millions, 700000 cube feet of water, which evaporate from the same surface, in the space of one year. Afterwards if we reduce all the rivers that fall into the Mediterranean to a canal ' fix Italian miles broad, and 15 feet deep (which is a very low supposition) such a canal will carry into that sea, a hundred thirty two trillions, five hundred thirty seven billions, three bundred eighty four millions of cube feet of water,—a quantity very much exceeding that which evaporates from that fea in one year. 'That Dr. Valisnieri may have no ground to complain, ' the Author is willing to grant him, against the testi-'mony of all observations, that thirty inches of water fall in Italy every year. But he tells him at the fame time, that all this water is not employed in keeping up the course of fountains and rivers. One must 'deduct out of it, 1. All the quantity necessary to 'moisten the ground to the depth of some fathoms, without which an excessive drought would reduce it 'to dust; and this quantity must needs be very con-'fiderable. 2. One must deduct that quantity which ' serves for the nourishment and growth of trees, and 'all the other plants of Italy, during the whole year; 'and in order to conceive how far this can go, it is fuf-'ficient to confider, that according to the experiments' of Mr. de la Hire, one single fig-tree, furnished with an hundred and thirty leaves, absorbs two pounds and 'a balf of water, in the space of five bours, and conelequently three thousand one hundred and ninety four 'pounds in one year. 3. One must deduct out of rain-water that which continually evaporates, the

• quantity whereof has been determined above. Now. · how likely is it that 30 inches of water yearly may be · fufficient for all those uses; and that there should remain enough still to keep up the course of fountains and rivers. Again; Dr. Gualtieri makes another im-· possible supposition in favour of his adversary, viz. that out of those 30 inches of water, 15 only are em-· ployed for the continual evaporation, and to supply the wants of the ground and plants; and that the other 15 'inches ferve for the course of fountains and rivers. But notwithstanding all the endeavours of Dr. Gual-' tieri in favour of his antagonist, what shift can the · latter make with 15 inches of water, whilft the 18 'inches found by the Academy, are, as has been ' shewn above, much beneath the quantity requisite to ' keep up that perpetual commerce between fresh and ' fea-water.'

II. Secondly, as the quantity of water that is poured into the Ocean from the mouths of all the rivers upon the earth proves the certainty of an Abyss beneath the Ocean and the Land, so the quantity that is thrown out at the beads or sources of all the rivers equally proves the same, and especially that this Abyss lyeth beneath the Earth as well as the fea. In the above description of several of the larger rivers, I have mentioned the length of their courses as well as breadth of their mouths, in order that the reader may judge from thence what an immense quantity of water is requisite for preferving their channels full, and keeping their currents ftrong; and also that he may observe that their Sources, or the Springs that supply them with water, lye high up in the inland countries, fo that feveral of them are some bundred, nay thousands of miles distant from the Sea they at last fall into; and some of their Springs rife in the very middle or centre of the largest Continents. So that since they are situated at fuch a vast distance from any sea, and take their rife generally in the highest mountains, the reservoir that supplies them with water must certainly be beneath those mountains. And since, besides these larger rivers there are a multitude of other rivers, rivulets, and fprings, that indifcriminately arife in, and pass thro' the different parts of any one of the larger Continents into which the world is usually divided, so that if a person would but take a view of the map of either of the Continents, and observe the heads of the several rivers that spring up in it, that Continent, and so the whole Earth, would appear as if it were bored thro? in innumerable places, thro' which a continual efflux of water proceeded; and from hence he will readily conclude, that the Earth is, as the Psalmist fays, fretched out or expanded upon water, or established upon

the Abys that lieth beneath; see p. 25, &c.

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To fay, that the Origin of these springs and rivers is owing to rain and vapours condensed against the sides of mountains, is, as we have already feen, falte in fact as well as anti-scriptural. But as it is the present prevailing opinion, it may be expected that I should examine the chief of the arguments usually brought in favour of it; which I shall do, and endeavour to confute them; and then introduce an experiment or two. which ought for ever to filence this opinion, and which indeed might make those ashamed of it that have embraced it. The first and chief argument,—that the quantity of water which falls in rain and vapours throughout the year is fufficient for the supply of all the rivers upon the earth,—has been already shewn to be an egregious mistake; there being no reason to think it sufficient for the supply of one of the larger rivers, much less for all, during that space of time. 2dly. It has been faid, That fince rivers increase and overflow their banks after any great rains, especially

fuch as are periodical, and after the flowing or melting of the fnow upon the mountains, it certainly follows, that their supplies are owing to rain, vapours or fnow .- But this is fo far from proving that the constant and regular flux of rivers (which is the point in queftion) is derived from hence, that it rather proves the contrary; and only shews that the sudden increase or accidental inundations of rivers may be owing to these causes; but does not at all account for the water that continually iffues forth from the springs or heads of rivers, and which affords them a constant and equable supply, when no such rains fall, and no snow is melt-Again; it has been faid, That the rain that falls, and the fnow that is melted, upon the mountains, fink thro' the earth, and is referved there in large cavities or basons, from whence 'tis gradually dispensed for the supply of springs and rivers.—But the above argument destroys this, for we find that rivers swell and increase immediately after and in proportion to the rain that falls or the fnow that is melted; and therefore, the water that proceeds from either is not detained within the mountains. And it is evident to fenfe, that, after any fudden shower or even a rain of long continuance, or the gradual melting of fnow, the water which proceeds from either flows down from the mountains along upon the furface, almost as foon as it falls, and does not enter into the bowels of the earth [unless where there happen to be natural hollows or pits dug for mining, &c. which lie open to the furface; and then some part of the rain that falls will of course pass thro' these; but as this tinges the water of the spring with the colour of the soil it has passed thro', fo its continuance is eafily diffinguishable, and it feldom lasts above a few hours after the rain] but in general, I fay, it is evident to fenfe, that the water which falls in rain or from fnow flows down from the

fides of the mountain in streams or torrents towards the lower grounds, and either unites with rivers and with them falls into the fea, or elfe fettles at the bottom of hills (but not upon the tops or fides, from whence fprings generally rife, and fo can afford no supply for them); and even from thence is in a few days conveyed away, part of it being evaporated by the heat of the fun, part carried off by the winds, part spent in the nourishment of vegetables, and part imbibed by the But it has been farther afferted, That, earth. fince in the hotter feafons of the year and in great droughts, when no rain has fallen for fome time, the fprings and rivers fensibly fail or are diminished; therefore, as their deficiencies are owing to want of rain, their supplies must be owing to rain. But this by no means follows, for the part that rain bears in the fupply of rivers is only (as we have feen already) an accidental increase or swelling of their waters, but has no share in affording a regular and sufficient quantity of water for their, otherwise, equable and constant courses. And the reason why springs and rivers fail or are lessened in great droughts and the hotter feafons of the year is evident, for during fuch times the heat of the weather and the action of the Sun-beams upon the water at the Spring-head (where the quantity is generally small, and in the channels of rivers will cause the water to be exhaled and evaporated in proportion to fuch heats and droughts, and therefore fprings and rivers will proportionably fail. Besides; in such hot and dry weather, the usual moisture of the ground is exhaled, and the furface of the earth parched and cracked into chasms and openings, fo that the moift vapours that arise from beneath or from within the earth, (of which more particularly hereafter) and which in a great measure afford supplies for springs and even for rain,

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are, when they come to the furface of the earth, attenuated, divided, and dispersed here and there (as our breath or the fume emitted from our lungs, is in the fummer-time) by the action of the fun-beams or heat in the air, instead of being collected and condensed at and under the furface of the earth (as is the case during the colder, and more moderate months) and fo faturating the vegetable mould, and replenishing fprings, &c. And hence it comes to pass (quite contrary to the hypothesis of springs being derived from rain, &c.) that tho' there falls in England and the adjacent countries a much greater quantity of rain in June and July than in December and January, yet the springs and rivers are much lower and the earth more dry in the two former months than in the two latter; and this certainly happens on account of the greater heat of the fun, and more copious exhalations from the earth and water; whereas in the two other months, the fun's power is less, and the surface of the earth closed and frozen; so that the inward or subterranean vapours are confined, condensed, and increased beneath the earth's furface; and hence springs and wells receive a surplusage of water, and the inward parts of the earth are quite fated or glutted with moisture, which collecting into drops falls more plentifully from the tops of caves, grottos, &c. during these colder months: and yet this is a time when Rain is not only less in quantity, but less able to fend supplies to springs, on account of the close union or compaction of the upper parts of the earth; fo that their fources must lie beneath the earth, and their supplies be inward, not outward.

^{*} WOODWARD'S Nat. Hift. p. 213. MARTYN'S Abridgment of the Memoirs of the Academy of Sciences, &c. Vol. II. p. 44.

But I shall now produce an experiment or two of Mr. de la Hire, sufficient to overthrow this whole theory of the origin of springs being owing to rain and vapours. This gentleman was resolved to bring this hypothesis to the test of experiments, and to examine it in its most essential article, viz. by endeavouring to find to what depth rain or fnow-water did really defcend into the earth. In order to know this, i 'He dug a hole in the lower terrals of the Observatory at ' Paris, and placed therein, eight feet under ground, 'a large leaden bason, a little inclined towards one of its angles, to which was foldered a leaden pipe 12 feet long, which, after a considerable descent, reached ' into a cellar adjoining. And after having covered ' the head of the pipe in the bason with several flints of different fizes, to prevent the orifice from being ftopped, he threw in a quantity of earth of a middle nature, between fand and loam, (and fo eafily per-' meable by water) to the depth of eight feet; and then ' judged, that if the rain and snow-water penetrated the earth to the depth that some springs are found ' at (which in digging wells and mines are discovered ' to be at all depths, from 8 to 800 feet) or 'till they · meet with the first clayey or compact stratum to stop ' them, that then the bottom of the bason would serve to stop and collect the water: and by this means there ' would foon be a fpring burfting forth thro' the leaden ' pipe into the cellar. But on the contrary, after having kept the bason in this situation for no less than ' 15 years, and the ground all the while exposed open to whatever rain, fnow, or vapours that fell, he 'could not observe that a fingle drop of water had ever

^{*} See Memoirs de la Academ. or MARTYN's Abridgment, Vol. II. p. 52. &c.

e passed thro' the leaden pipe into the cellar.—At the · fame time that he begun the above experiment, he e placed another bason about 8 inches under ground, and chose a place where the rain and vapours might · fall, and yet the ground be screened from the heat of · the fun and the action of the wind, and took care to e pull up all the grafs and herbs which grew over the bason, that all the water, which should fall on the eground, might pass uninterrupted to the bottom of the bason, wherein was a little hole, with a tube to convey the water into another vessel. The effect was, that in all the space of time from the 12th of June to the 19th of February following (more than eight, " months) no water came by the tube from the bason; and tho' it began to run on the 19th of February, this was-entirely owing to the great quantity of fnow which had fallen, and was then melting. From that time the earth in the bason was always very moist, though the water would only run a few hours after raining, and it ceased running, when the quantity fallen was drained off.—A year after, he repeated the fame experiment, but buried the bason 16 inches under ground. He took care also that there was no e grafs on the ground, and that it might be screened from the fun and wind, which would dry it too fast. The effect was much the fame as in the former, excepting that when a confiderable time paffed without raining, the earth would grow a little dry; fo that a moderate rain coming on, it would not moisten it fufficiently to make it run.—Laftly, planted berbs on the ground over the bason, but found, that when these were grown up a little, the ground was fo far from fending any water after rain, that all that fell was not sufficient to sustain them, but they would droop and wither, unless re-sprinkled from time to time with water.' This, I think,

abundantly proves, not only that the rain-water does not penetrate the earth, fo as to form the smallest collection of water, above 16 or 18 inches, but that the quantity that falls, is not sufficient to furnish the quota requifite for the growth of vegetables; fo that we must call in, as the above-mentioned author remarks, ' some foreign affistance to support them;' which also he found to be true from ' several experiments that he made upon the quantity of water eva-' porated thro' the leaves of plants.' And what he favs concerning the rain-water not finking above 16 or 18 inches in a foil of a middle nature, between fand and loam. I have observed to be nearly true even in the most lax and gravelly soil, such as that in the low-lands about Oxford, which confifts of small round pebbles and fand. I have examined it frequently after the hardest rains, and those of long continuance, but could never perceive that the rain had descended, (tho' the ground was upon a level, in a valley, and of a wide extent) above 20 inches or two feet at most; and at about this depth I observed in several places where the earth was opened, that the gravel was uncommonly hard and compact, the parts of it so intimately united, that it formed a kind of stratum, which in tenacity equalled fome kinds of strata of stone: and upon examining the reason of it, I found it to proceed from hence, that the rain water had drained down as low as this, and here lodged; and as it descended, it had carried with it the fmaller granules of fand and other finer matter, which being reposited among and between the other pebbles, cemented them close together and confolidated the whole; and that this was the cause of their union was manifest from the finer matter being affixed to the fides and under-parts of most of the pebbles, just in the manner as the draining or last sediment of water would naturally leave it. But,

I say, after repeated observations, I could never perceive that the rain-water had penetrated thro' this compact stratum of gravel; and unless the rain had been of long continuance, and the weather very moist and wer before, I could not find that it had penetrated even thus far; but saw plainly that all the rain that fell was not sufficient for the support and nourishment of the herbage and vegetables; which, unless they had been affished by the foreign supply of the vapours that ascend from the inside of the earth or which proceed from beneath upwards (not those that fall from the clouds, or from above, downwards) would soon have drooped and withered, as those planted by the above-

mentioned gentleman did.

IT appearing then thus evident that the origin of Springs and Rivers is not owing to rain or any vapours that may fall from above, we must seek for an internal supply, for a magazine of water underneath the earth; and how immensely great this must be, I have given the reader reason to judge from what has been said at the beginning of this argument, p. 105. may be proper (in order to obviate all objections and entirely to clear the subject I am upon) to explain how and by what means the water of this subterranean Abysis is conveyed to the tops of the highest mountains, and there breaks out in Springs, &c. any one that has but just looked into the inside of the earth, and observed the structure of it, cannot but know that the strata or beds of stone, &c. of which it consists, have innumerable cracks or fissures in them, fome perpendicular, others oblique, and others horizontal, or rather such as intersect and divide the strata at all angles, and in all directions whatever; and also that these fissures are of various sizes and capacities, from some that are several feet in breadth to a multitude of others that are not more than a line in

width, or even invisible ('till some force be applied to the stone, &c. and then the stone will break into small shatters or fragments, and discover where these cracks were, as every one knows); and it is also certain, that feveral of these fiffures or rather these divisions or partings of the regular strata are filled with a rubbley-kind of matter, confifting of a mixture of small loofe stones, clay, fludge and fand; and that others of them are It is also well known to those that quite open.i are at all conversant in the subterranean world, that there is a moist vapour or a kind of steam continually paffing, from beneath upwards, thro' the shell or crust of the earth; and that this vapour pervades, not only the fmaller and leffer fiffures, but even the interffices and pores of most forts of stone, &c; and that the deeper you descend, the more sensibly and forcibly this vapour acts or ascends.k Now upon the certainty of these two facts (the reality of which any person may be convinced of, by giving himself the trouble of looking into the infide of the earth) we shall be under no great difficulty in accounting for the afcent of the fubterranean water to the tops and fides of mountains for the origin of springs, rivers, &c. For, first, fince the Earth is thus cracked and divided, from the bottom of its shell to the top, into an innumerable number of fiffures of various shapes and various sizes, it cannot but be that the water of the Abyss pervades these cracks and enters up into them to a level with the water of the Sea: for however irregular and winding these fissures may be, yet it is evident, from the common experiment of immerging feveral tubes that are of the most different shapes and sizes into a vessel of water, that the water will rife to an equal height

E See Note k p. 41. and the references.

^{&#}x27; See the Explanation of the Plate under the Letter F.

in each, and be level with the furface of the water in the vessel; and so must the water of the Abyss stand with respect to the surface of the Ocean. So that if we were to suppose the Earth, or rather the mountainous Part of it, to be cut off to a level, or concentrically, with the furface of the Sea, it is certain that the fiffures and chasms, which communicated with the Abyss beneath, would be full of water to their very tops, notwithstanding the Pressure of the outward Air upon them; for, neither this por the irregularity of the fubterranean canals would prevent the water from rifing in every one of these fiffures to a level with the furface of the Ocean, as is evident from the above-mentioned well-known experiment. Nay, it will rife much higher, for (as Dr. Gualtieri justly observes) 'Two Liquids of an unequal weight, ' put in an equal quantity into two equal tubes raised e perpendicularly upon the fame plain, have a different height relatively to their weight. This being laid 'down, 'tis certain by many experiments, that Sea-' water is heavier than fresh water, and that the gravity of the first is to that of the second, as 103 to And therefore if we suppose the Sea to be an 100 feet deep, and that the fea-water being deprived of its falt by filtration, fills up the fubterraneous ' passages thro' which it circulates, it may rise to the height of 3 Feet above the level of the sea. Now, if we suppose the sea to have the depth of an Italian ' mile, which makes 5000 feet (measure of Bologna), ' fresh water may rise to the height of 150 feet above the same level. That height of 150 feet is already ' fomething confiderable for a mountain. But because some are much higher, at the tops of which there are Springs of fresh water; we may observe, 'that in many places, Pilots have not been able to ' measure the depth of the sea, because they could not

' find the bottom of it; but the' they should find it in fuch places, one may very well suppose that there are in them abysses, caverns, &c. which the plum-'met does not reach, and which penetrating into the most internal parts of the earth, from a perpen-'dicular column of falt-water of an immense height.' Now if, under these circumstances, we suppose the mountainous part of the earth or that portion of its sphere which is higher than the surface of the Sea (and which we before supposed to have been taken off) to be re-placed in its first and original position, so that the fiffures in the mountainous Part shall be directly over the fiffures that are full of water to their tops (as is the real fituation of them in the present structure of the earth) how foon, in this case, and to what a height would the water of the Abyss be pressed up thro' the fiffures into the mountains? For now the perpendicular pressure of the outward Air upon the furface of the water in the fiffures being taken off or eluded by the covering of the mountains or their fuperincumbent strata, the subterranean water, by the force and action of the outward Air upon the Seas and the weight of the falt water in the Seas (which communicate, or are one, with the Abyss), would be forced up through the fiffures in the mountains vaftly above the level of the Sea; in the same manner (to compare great things with fmall) as water is preffed up thro' the pores in a heap of fand, or thro' the cracks in a block of stone, whose bottom or under-part lies immerfed in a pond of water, but whose upper part is much above it; for by this fituation of the Sand or Stone, that part of either which is prominent or above the water receives the perpendicular preffure of the outward air upon its exterior furface, and so eludes or weakens the action of the Air upon the water that is under or in the pores of the stone; and

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alfo, comparatively speaking, increases the pressure and strength of the external Air upon the surface of the water in the pond, which therefore will force the water that is least pressed (viz. That which is under and in the pores of the stone) to that place where it can find easiest admittance, which will be up into the pores and cracks in the stone, as there is the thinest Now if we carry this medium and freest passage. analogy farther, and confider that the whole furface of the earth is compressed by the strength of the Expanse, or the Fluid of the Heavens surrounding and binding it on all fides; and that this Pressure or Tenfion is fo very great and fo closely applied to every part, as to preserve the earth in its present solid state and circular form (tho' it be revolved fo immensely fwift upon its axis).* And when we farther consider, that, while the external Air or groffer part of the Heavens (the Spirit) presses chiefly upon the surface, the finer, purer, or the ethereal Part (the Light) pervades and reaches the inmost recesses of the earth (for, we find, that no terrestrial body can deny it entrance) and penetrates even to the center. And as there is a new and fuccessive stream of Light, almost instantaneously, moving or impelled from the Fire at the Sun, and continually pressing against, and making its way into the orb of the earth (chiefly at or under the torrid Zone), and having passed thro' the shell or the waters of the Ocean, enters into the Abyss and there agitates and expands the water: And as in order to gain itself admittance and occupy a space in the Abyss equivalent to its own bulk or quantity, a proportionable quantity of other matter must recede, give way, or pass out of the Earth; fo this receding matter, as

^{*} See also what is said of the *Pressure* of the air, in the note, p. 37.

To explain this somewhat farther. It is now, I think, universally allowed that Light is a body or a material substance. And when we consider that its particles reslected from a concave speculum,

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nd m, it is impelled upwards from the center to the surface, would take the easiest and readiest passages it could find, and therefore would endeavour to pass thro' the cracks and sissures of the earth; but as all the sissures that communicated with the Abyss beneath, were before sull of water, even to a level with, or rather much bigher than the surface of the Sea, so this receding matter in its ascent would certainly contribute towards forcing the water in the sissures still bigher up

act with fuch force as to divide and instantly to split afunder the parts of a diamond or the closest body we know, it must be allowed to be a substance inconceivably hard and subtle; and its motion immensely fwift and frong: which last article is further evident from the almost infinite number of reverberations it will endure from specula to specula, and yet its angle of reflection be equal to its angle of incidence. Such being the Solidity, Subtilty, Activity, and Velocity of Light. no terrestrial body furely can prevent its passing thro' their pores, and when we confider that the Earth has been exposed to the action of this subtile penetrating Agent for several thousand years, there certainly can be no space in it, that can receive an atom of Light, but what has one; and therefore the Earth from center to circumference is a Plenum, or there is no one atom in it, but what is in contact with another atom, of some kind or other, but chiefly with the particles of Light; as is evident not only from the tenuity of this body which will premeate the pores of any other, but fince the far greater part of the terraqueous globe is in a state of fluidity or confists of water; and we know that the action or comparative non-action of Light, Heat or Fire (for each are the fame in substance, and differ only in degree or manner of motion) causes the Fluidity or Solidity of water (its fluid or frozen state); and as the earth is warmer, the deeper we descend; and there is an immensely large sphere of water in a state of fluidity and motion or perpetual circulation underneath the earth (as will more evidently be shewn hereafter); so there must be a free admission and full penetration of the particles of Light thro' that mass of water in order to preserve it such or keep it in a state sufceptible of easy motion and brisk circulation. Such being the condition of the earth; and fince it is impossible that any two bodies can subfift together in one and the same place, it must follow, that wherever, in such a plenum as the above-mentioned, there is an intrusion of any other body or matter, there must be a protrusion of some other matter, quantity for quantity.

or nearer to the tops of the mountains: And this its Effect must be judged of from the nature and force of this receding matter. We must therefore next determine what this matter is. Now this can be no other than the above-mentioned subterranean moist vapour; it being certain, that this is inceffantly passing thro' (and we know of no other matter that is fo) the shell of the earth from beneath upwards or from the center to the circumference; and it answers in its nature and form what we might justly expect such receding matter to be. For it cannot but be allowed, that, as the Light penetrated into the Abyls, and protruded or pushed out other matter to gain itself admission, the matter thus driven out would be the finest and purest that was in the Abyss, which could be no other than the Light and fine Air that were there before (for it is certain that there is some, tho' very pure air, as well as Light, in the Abyss, else fishes could not live and breathe at the bottom of the Ocean; nor the water of the springs that are discovered at the lowest depth in the earth be so replete with air). this Light and fine Air were pushed outward, they must of course pass thro' the water of the Abyss. And as this water had been before rarified and expanded by the colluctation of the atoms of Light between themselves (and it is not improbable, fince the earth is of a spherical form, that the rays of light which pass thro' the Ocean and the Abyss, on each side of the equator, are refracted or converge towards one another till they meet in a focus near the center of the earth; and then the heat and agitation would be much greater) and also by their struggle to disposses and drive out the fubterranean light and air, fo this light and air thus driven out would arise from the Abyss in form of fleam or vapour; which we find actually Now this vapour, in its paffage to be the case.

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from the Abyss thro' the cracks and pores in the strata of the earth, would not only be a means of elevaring the water in those cracks, but would itself be turned or condensed into water (as the steams that rife in an alembick are) as it struck against the tops, fides, and irregular hollows in the fiffures; and by this repeated action be continually forming into drops, and trickling down the fides of the fiffures; and thus, not only increase the water that was before passing thro' the fiffures, but in fome places, where there were natural basons or cavities in the rock, be amassed in considerable quantities. And if such basons or fissures happen to be higher than the ordinary furface of the earth, or than the lower grounds (as is the fituation of them all in mountains) the water thus collected, or rather inceffantly collecting would break out, whereever it could find vent, on the outfide of the mountain, and there form springs, rivulets, &c. But if the basons or fiffures in the inside of the mountain be not higher than the mean furface of the earth, or there happen to be any depressed or hollow place on the outside of the mountain, the water that ouzed out of the infide would then fall into them, and there fettle; and become either small pools or large lakes, according to its extent or quantity. And thus, by this inward fupply, by the afcent of the fubterranean water and vapour, there will be a constant Fund and fufficient Source of water for the production of Springs, Rivers, Lakes, &c. throughout the whole earth.

But there is a difficulty attending this account of the origin of Springs which may be thought too material to be passed by without a solution: and that is, —That if Springs derive their water from the Sea or from the Abyss which communicates with the sea, how comes it to pass, that Spring-water is not salt and briny, like the source from whence it proceeds; but on the contrary is generally fresh and sweet, or infipid. Now supposing the Abyss beneath the earth to be falt like the Sea (which yet we can have no abfolute proof of; and I could give feveral reasons to shew, that it may not be so, at least, not equally salt with the Sea) yet we may folve the difficulty upon the following facts and observations. First, let it be remarked, that Sea-water may be divested of its faline particles, and is frequently rendered fresh in a natural way; - the vapours that are exhaled from the fea, and which fall again in fresh showers of rain, is one proof of this; - and the flesh of fish, which are caught, and which before lived and fed, in the Sea, being sweet, is another proof of it; -and from an experiment which Mr. Lister made, it is certain, that the water which is fucked up (as we commonly fay) or rather impelled and strained through the tubes and vessels of the Alga marina or common Sea-weed is fresh, sweet and potable; tho' the distillation be made from a bason full of falt-water. Or, what is more applicable to the present case, Mons. Marfilli having filtrated a certain quantity of the faltest and heaviest Sea-water he could procure thro' feveral veffels filled with fand, all which together made up a cylinder of fand of 75 inches in depth, found, that the water had lost near one half of its degree of faltness; and concluded that had it been strained again thro' twice the same quantity of fand, it would have been entirely deprived of its faline particles;" or we may fafely fay, that had it paffed thro' a cylinder of fand, confifting of as many feet, as the above did of inches, it would have been as pure and fresh as the water of the wells of St. Mary's on the shore of Languedoc in France, which Marsilli

De la Mer. p. 33.

⁻ Phil. Trans. No. 156. or Lowshorp's Abridg. Vol. II. p. 297.

fays are not more than 60 feet distant from the nearest place where the Sea-water reaches. Here then are feveral strainers, or means by which Sea-water may be percolated and rendered fresh, in an easy, natural, and expeditious way. Now tho' the pores of the earth are larger or more open than the strainers here mentioned, yet when we consider the bulk of the earth or the thickness of its shell, the great variety of strata of which it confifts, the many turnings and windings of the fiffures (by means of which the fubterranean water may pass thro' this variety of strata), the thick gross vapour that is continually passing thro' the whole body of the earth, and the great quantity of Sea-weed and other marine productions that are at the bottom of the Ocean, especially in such calm and quiet places as the cavities at the mouths of the fiffures, I fay, taking all these into consideration, which may be efteemed as fo many percolators, and tho more open and porous than the above-mentioned, yet by the length of their courses and the variety of their substances; they will certainly answer the end of the afore-men-And this appears to be fact from hence, That in such places where the Sea-water has admission into the earth, the Springs and Wells are more or less brackish, as they are nearer to, of fatther from the Sea. Thus Mr. Norwood, speaking of the Bermuda islands, says, " We dig Wells of fresh water ' sometimes within 20 yards of the sea, or less; which rife and fall upon the Flood and Ebb, as the fea 'doth; as do most of the wells in the country, tho' 'further up (as I am informed). Wherefoever they 'dig wells here, they dig 'till they come almost to a

. De la Mer, ibid:

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Lowthorp's Abridg. Vol. II. p. 298.

· level with the superficies of the sea; and then they · And either fresh water or falt. If it be fresh, yet if they dig two or three feet deeper, or often lefs, they come to falt water. If it be a fandy ground, or a · fandy crumbling stone, that the water foaks gently thro'. they find usually fresh water; but if there be hard 'lime-stone rocks, which the water cannot soak thro', but passeth in chinks or clefts between them, the " water is falt or brackish." Varenius relates the same of feveral places, and observes that Springs near the Ocean are falt or brackish, and the nearer they are the fea, the more they are fated with falt; as on the ' shore of Africa, and in India, chiefly on the shore of · Coromandel, where no vines grow, and all their wells Near the town of Suez, at the end of the tafte falt. · Red Sea, their springs are all falt and bitter; and even the water which is fetched two German miles from the shore, tastes a little brackish. Also in several small islands there are no fresh springs but 'all falt (tho' fomething less sated than the Ocean) as in the island of St. Vincent, and others. In the 'low countries of Peru that border upon the Ocean, their Lakes are saltish, because of the vicinity of the Sea. But farther up in the inland countries, it is well known, that the Springs and Lakes are fresh Hence then we may fairly conclude. that the water of the Ocean and the Abyss is, by a gradual filtration thro' the strata of the earth, strained and purified as to leave behind all its saline or briny particles, and when it arrives at a due diftance (either greater, or less, according to the porofity or tenacity of the strata it passes through) from its original refervoir, there to become fweet and fresh, or at least divested of its primitive qualities.

[.] VARENIUS's Geography, Part I. Ch. xvi. Proposition 5.

ther proof, that the water of the Abys, in its pal fage thro' the strata of the earth, deposits its faline particles, may be drawn from the peculiar qualities of mineral Springs; of which there are almost an infinite number, differing from each other in the most diftinguishable properties, according to the particular species of the mineral or metallic effluvia they are impregnated with; and tho' feveral of thefe have a taltish taste, yet it is well known, that even That proceeds from other falts than those which the Sea-water is replete with. Whence it must follow, that all mineral waters, before they arrive at their outlets, have not only deposited their saline particles, but even affumed others, very different and diffinet there-And fince this is the case, we may fairly fuppose; that where the subterranean water passes through strata that have no proper, or no great quantity of proper, matter for the production of mineral waters, that there it will break out in forings of pure It may not be amifs to observe and fresh water. in this place, that, upon the supposition of Springs, being owing to rain or vapours that fall upon, and make their way through the outsides of the mountains. to the places from whence they rife, it is altogether abfurd and impossible to conceive, that the fmall portion of the earth which lies above feveral mineral fprings, especially such as break out near the tops of the highest mountains, can be sufficient for affording a constant and equable supply of mineral matter for the impregnation of them. Besides; it is well known, that in such places where mineral Springs are, and there happen to be any cavities open at the furface of the earth, or any chinks or crevices in the rock, through which the rain-water may descend and gleet down to the fissure through which the mineral water flows, that in fuch cases the rain-water is so far from increasing the vir-

tues of the Spring, that it either destroys or lestens them for a time, and renders fuch as are hot and warm cold or cool, such as are acrid and bitter somewhat sweet or less acrid, and so of the rest; which plainly shews, as I observed before, that when rainwater permeates the earth, and reaches the water of Springs, it only makes an accidental or temporary increase, but does not afford the constant and regular flux; and is fo far from being the Source of mineral water, or bringing down any matter proper for the production or continuance of fuch Springs, that were it reaches them, it in part destroys their qualities; which, I may observe, the Springs recover again when the rain is over: fo that their supplies cannot be owing to rain: and we must feek deeper for their sources than that small portion of the earth which rain-water penetrates; and therefore must have recourse to a subterranean reservoir. And upon the supposition of an Abyss of water beneath the earth, as the grand fund or promptuary of all Springs, thereis the whole thickness of the shell of the earth, consisting of a variety of different strata, filled with a variety of foluble mineral and metallic particles, and the fiffures full of a gross watery vapour, that has passed through the neighbouring strata, at every crack and cranny, replete with the mineral or metallic effluvia that it has brought out of these strata, - There is all this, I say, for the waters of the Abyss to make their way through; before they break out in springs on the surface of the earth. So that there is reason to believe, that some mineral waters may have loft their original properties, gained others, lost them, and have regained their original or others of the same kind, before they appear as Springs; and certain it is, that feveral of them come up endued or impregnated with a variety of mineral qualities, and thereby shew the large space they have ranged through

for the acquisition of them. And though the mouths or first passages of the fistures that reach from the Abyss to the surface of the earth, are probably large and fo open as to admit freely to fome distance the fubterranean water, endued with its peculiar properties, whether faline, or whatever they are; yet as these fisfures gradually lessen as they tend towards the furface of the earth, and frequently break off or run into other fiffures that are of an horizontal or oblique fituation, which again divert and branch off into others still less, and some so small as to be invisible; fince many of these fisfures, are filled with a rubbley kind of matter, as fand, clay, fludge, small stones, &c. and so fit for straining and refining the water; fince the subterranean Vapour, by being condensed against the tops, and trickling down the fides of the fiffures is continually adding fresh supplies of water that has been purified or deprived of its original properties by evaporation and distillation; and since there is a perpetual ouzing of water into the larger fiffures through the cracks and crannies in their sides; to which 'continual distilling alone, gleeting, or strain-'ing of the watery particles through the terrestrial stra-'ta' Varenius attributes the deprivation of the faline particles in the sea-water; and justly remarks, 'that we observe this very thing in mines digged to a vast depth (and the deeper we descend, the more discernble it is), how that water on every fide is conti-' nually dropping, and collecting itself into small guts, which are called veins of water; and if several such guts or runnels as these, concur in one receptacle, they form a fountain, as they who make drains, to bring water into wells, very well know:"---Now all these circumstances being added together, we cer-

General Geog. p. 305.

tainly have a folution to the above-mentioned difficulty, and have reason enough to conclude, that the water of the Abyss, in its passage through the strata of the earth, is deprived several times of the different qualities it gains, and therefore, soon after its permeation, is entirely divested of its saline or original

properties, whatever they be.

Thus, I hope, I have now cleared my way, and fufficiently answered every material objection, and plainly shewed. That the origin of Springs is owing to an internal supply; the water of which, by the general action of the Air upon the Seas and (by their communication) upon the Abyss, and by the recess of the finer Air and Light from the centre of the earth to the circumference,—is impelled or pressed up through the cracks and fisfures in the terrestrial strata to the tops of the highest mountains. And as there are Springs breaking out all over the furface of the earth, as well in the most inland as the maritime parts; and these Springs are the Heads or Sources, from whence that profusion of water proceeds which affords the conflant, uninterrupted, and regular streams or courses of all the numerous rivers upon the earth, it must follow that there is an internal magazine or an Abys of water beneath the earth; and that this Abus is also equal in extent to the lower part of the shell of the So that as I before argued, that, from the quantity of water poured into the Ocean from the mouths or at the ends of all the rivers upon the earth, there must be an immensely large Receptacle beneath the Ocean for containing it, so from the quantity that is thrown out at the Heads or Sources of all the rivers, there must be a Reservoir beneath the earth for supplying this; and if these two Conservatories were not full and in union with each other, there must soon appear a great superfluity in one, or a great deficiency in the

other, but as neither of these is observed, they must be in conjunction, and a mutual interchange and perpetual circulation be maintained between them. And hence is evident that two-fold scriptural argument Eccles. i. 7; the first part of which I have already quoted, proved, and shewed the reason of from Nature; and by now adding (fince I have proved) the fecond, they will, when united, corroborate each other; -All the rivers run into the Sea, yet the Sea [the general collection of waters, including the Sea and the Abysis; see page 25, and p. 36.] is not full; —unto the place from whence the rivers come, thither they And, I hope, it now at last apreturn again. pears, from all that has been faid, to be no more wonderful that there should be a circulation of waters throughout the earth, and that Springs should break out on the tops of the highest mountains, than that there should be a circulation of blood in the human body, and that a man should bleed, when pricked, in the veins or arteries of his forehead, as freely as in those of his feet. For, the same Cause produces both these effects. The Blood, -by the pressure of the outward Air or Atmosphere upon, and by the penetration of the finer Air and Light into, the human body,—is impelled or ejected from the Heart (the Centre) into the arteries to the extremities of the body, and from the arteries is forced into the veins, and by the veins is refunded back into the heart: So the Subterranean or Central Water, by the same Agents and after the same manner, is pressed up through the veins or fiffures in the earth to its extreme or highest parts, and from thence is conveyed down, through the channels of rivers, into the Sea, and from the Sea is returned into the Abyss, from whence it . first came. And the afcent of these two Fluids (the Blood and the Water) is as natural as the descent; for

peither of them having any innate Gravity or Levity, but, like all other matter, being indifferent, and therefore subject, to motion any way, they are moved either up or down, this way or that, just as they are impelled by the Universal Agents Light and Air.

III. Thirdly. Another Proof of a Subterraneau Abys of water may be drawn from Whirlpools, Un-

der-currents and Gulphs in the Ocean.

Or the first of these is that remarkable Whirlpool upon the coast of Norway, which is thus briefly described by Gordon in his Geographical Grammar, p. 76. Upon the coast of Norway, near the isle of Hitteren in the latitude of 68, is that remarkable and dangerous whirlpool, commonly called Maelstroom, and by navigators the Navel of the Sea. Which whirlpool is, in all probability, occasioned by some mighty subterranean Hiatus, and proves fatal to ships that approach too nigh, provided it be in the time of flood: for then the sea, upwards of two leagues round, makes such a terrible Vortex, that the force and in-draught of the water, together with the noise and tumbling of the waves upon one another, is rather to be admired, than expressed. But, as in the time of flood, the water is drawn in with a mighty force, so during the tide of ebb does it throw out the fea with fuch a violence, that the heaviest bodies then cast into it, cannot fink, but are tossed back again by the impetuous stream which rusheth out with incredible force. And during that time is abundance of fishes caught by fishermen who watch the opportunity; for being forced up to the fur-' face of the water, they cannot well dive again, fo 'violent is the rifing current.' Some have imagined from the circumstance of the bodies that are thrown into this Vortex being returned again, that therefore there

is only a great Cavity with a confined bottom, but no Hollow or Passage through the shell of the earth. But were there not a free passage for the waters thro' the whole shell of the earth, I cannot see how they could return with fuch impetuolity as here described, and the reason why the bodies thrown in do not totally disappear but are cast back again, is, in all probability owing to the irregularity of the aperture or channel of this Vortex, being in some places narrower, in others broader, as is the form of the natural cavities in the earth, and even of those in the Sea, where we can visit them, as witness those remarkable ones in the bottom of Zirchnitzer Sea in Carniola, described

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in the Phil. Trans. No. 54, 109, 191. AGAIN; 'The Caspian Sea (fays Stackbouse in his History of the Bible, Vol. I. p. 122, citing for proof Moll's Geography, p. 67. Stilling fleet's Orig. Sacr. 1. 3. c. 4. and Bedford's Scripture Chronology, c. 12.) 'is reckoned in length to be above an 120 German 'leagues, and in breadth from east to west about 90 of the same leagues. There is no visible way for 'the water to run out, and yet it receives in its bosom 'near an hundred large rivers, and particularly the 'river Volga, which of itself is like a Sea for large-'ness, and is supposed to empty so much water into 'it in a year's time, as might suffice to cover the whole 'earth [see p. 105.]; and yet it is never increased nor diminished, nor is observed to ebb or flow, which makes it evident, that it must necessarily have a subterraneous communication with other parts of the world. And accordingly, Father Avril, a modern traveller, tells us, that near the coast of Xylan there is in this Sea a mighty Whirlpool, which fucks in every thing that comes near it, and confequently has a Cavity in the earth, into which it descends."

Or a fimilar nature and of the fame name with the above Sea is another in Hispaniola in the West-Indies. which (as Peter Martyr in his History of the West-Indies. p. 135, informs us) confifts of falt, four, and bitter water, as we read of the Sea called Caspium, (lying in the firm land between Sarmatia and Hircania); we have therefore named it Cafpium. It hath many · fwallowing Gulphs, by which both the water of the great Sea springeth into it, and also such as fall into it from the mountains are swallowed up, . The rivers which fall into this Lake or Sea, are thefe; from the North, Guanicabon; from the South, Xac-" coci; from the East, Guannabo; and from the West, · Occoa; they fay, that these rivers are great and con-* tinual, and that belides these there are twenty other * small rivers which fall into this Caspium. This Lake ' is toffed with florms and tempelts, and often drowneth finall ships or fisher's boats, and fwalloweth them "up with the mariners, infomuch that it hath not been heard of, that any man drowned by fhipwreck was ever cast on the shore, as commonly chanceth of the "dead bodies of fuch as are drowned in the Sea."

dead bodies of fuch as are drowned in the Sea.'

Of Under-Gurrents, Dr. Smith in the Phil. Trans.

No. 158. writes thus, 'In the Offing between the North-foreland and South-foreland, it runs tide and half tide, that is, it is either ebbing water or flood upon the shore, in that part of the Downs, three hours, (which is, grossly speaking, the time of half a tide) before it is so off at sea. And it is a most certain observation, that where it flows tide and half tide, though the tide of flood runs alost, yet the tide of ebb runs under soot, that is, close by the ground; and so at the tide of ebb, it will flow under soot. There is a vast draught of water poured continually out of the Atlantic into the Mediterranean, the mouth or entrance of which between Cape Spartel or Sprat,

as the feamen call it, and Cape Trafalgar, may be the near feven leagues wide, the current fetting strong ties, into it, and not losing its force 'till it runs as far as lies, Malaga, which is about twenty leagues within the tter Streights. By the benefit of this current, though ing the wind be contrary, if it does not overblow, thips we easily turn into the Gutt, as they term the narrow any paffage, which is about twenty miles in length. At of the end of which are two towns, Gibraltar on as the coast of Spain, which gives denomination to the up. freights, and Ceuta on the Barbary coast: at which ele: · Hercules is supposed to have set up his pillars. What Xacbecomes of this great quantity of water poured in eft, this way, and of that, which runs from the Euxine oninto the Bosphorus and Propontis, and is carried at ther last through the Hellespont in the Ægean or Archipeake lago, is a curious speculation, and has exercised the neth wit and understanding of philosophers and naviganem tors. For there is no sensible rifing of the water reen 'all along the Barbary coast even down to Alexandria: was the land beyond Tripoli, and that of Egypt lying very the low, and easily overflowable. They observe indeed that the water rifes three feet, or three feet and a half, ans. in the Gulf of Venice, and as much, or very near as the much, all along the Riviera of Genoua, as far as the and river Arno: But this rather adds to the wonder. ood 'My conjecture is, that there is an Under-current, hree 'whereby as great a quantity of water is carried out, half as comes flowing in. To confirm which, befides nost 'what I have faid above, about the difference of tides half 'in the Offing, and at the shore in the Downs, which tide necessarily supposes an Under-current, I shall present nd; 'you with an instance of the like nature in the Ballick oot. 'Sound, as I received it from an able feaman, who ally was at the making of the trial. He told me, that outh rat,

being there in one of the king's frigates, they went in their pinnace into the middle stream, and were carried violently by the current: That soon after they sunk a bucket with a very large cannon-bullet to a certain depth of water, which gave a check to the boat's motion; and sinking it still lower and lower, the boat was driven a head to the windward against the upper-current; the current aloft, as he added, not being above four or five fathom deep, and that the lower the bucket was let fall, they found

' the under-current the stronger.'

So also Marfilli (as quoted by Mr. Ray in his three Physica-Theological Discourses, p. 81.) affirms, 'That the lower water in the channel of the Thracian Bos-' phorus, is driven Northward into the Euxine Sea, 'whilst the upper flows constantly from the Euxine Southward. And that that which flows from the South is falter and heavier; which he found by letting down a veffel close shut up, fitted with a valve to open at pleasure, and let in the lower water, which being brought up and weighed, was observed to be ten grains heavier than the upper. That the · upper and lower flow contrary ways, he found by the 'fishermen's nets, which being let down deep from ' veffels that were fixed, were always by the observa-' tion of the fishermen, by the force of the current driven towards the Black Sea: and by the letting down of a plummet; for if it were stopped and detained at about five or fix feet depth, it did always decline towards the Marmora or Propontis, but if it descended lower, it was driven to the contrary part, And though Mr. Ray speaks that is, the Euxine. of this (and also of the Under-current at the Streight's Mouth) as being 'the concurrent and unanimous vote . and fuffrage of mariners, voyagers, and philosophers, yet he seems to make a doubt of it, because, says he,

I do not understand how waters can run backward and forward in the same channel at the same time; for there being but one declivity, this is as much as to affirm, that a heavy body should ascend. But surely Mr. Ray may easily conceive, how water may be made to run into a vessel or pond at one part, and be made to run out in a contrary direction at the bottom by means of a cavity beneath, and so two different Currents be formed; which certainly is the case in the above-mentioned seas; there being a great cavity or aperture at the mouths of each leading into the Abys beneath, which causes a current different from, and in a contrary direction to, That which ap-

pears upon the furface of the waters.

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VARENIUS (in his System of Geography, Chap. iv. Sect. iv.) gives an account of the feveral principal Currents in the Ocean; some of which are certainly owing to subterranean gulphs or passages that lead under the earth, particularly the two that follow, (as he himself imagines) since they set in towards the Shore; 1. 'The most extraordinary Current of the sea is that by which part of the Atlantic or African Ocean 'moves about Guinea from Cape Verd towards the curvature or bay of Africa, which they call Fernando Poo, 'viz. from West to East, which is contrary to the ge-'neral motion. And fuch is the force of this current, 'that when ships approach too near the shore it carries them violently towards that bay, and deceives the 'Mariners in their reckoning.—This current effects not 'the whole Ethiopic Ocean, only that part which is ad-'jacent to the shore of Guinea, to the end of the bay, 'and to about one degree of fouth latitude. It is ob-'served not to exceed the distance of fourteen miles 'from the shore; therefore ships are very careful lest they should approach so near, when they fail along

these coasts; which would hinder their intended course and drive them to a place they would not care to visit.' 2. The second perpetual current is

where the Ocean moves swiftly from about Sumatra

into the bay of Bengal, from fouth to north [that is from the sea towards the shore]; so that it is probate the shore was made by the rapidity of the arrange of the same state.

ble this bay was made by the rapidity of the current.
I do not know whether the cause may be owing to the

* many islands, and to cape Mabo, upon the fouth con-

be diverted northwards, or there may be a fubterra-

oneous Receptacle in the bay itself.'

The reader may see descriptions of several other lesser Gulphs, Whirlpools, and Under-Currents in the Sea in Kircher's Mundus Subter Lib. ii. & iii; and from viewing and considering the number and situation of them, we may reasonably conclude that there are sew or no Seas without one or more of such Gulphs, and consequently that there is an immense quantity of water daily poured into the inside of the earth through the mouths of them all.

And here, by the way, I may just animadvert upon the inaccuracy of those writers who have endeavoured to prove, by exact mathematical calculation (which proves just nothing at all when sounded on false facts), that the quantity of water which is raised from the Ocean in vapour is equal to that which is poured into it by all the rivers upon the earth, without having taken notice of, or made any allowance for, these Under-currents and In-draughts, which must necessarily carry off a great quantity of the water. I have already had occasion to examine this opinion at large (page 108, &c.) and have shewed the falsity of it from facts and experiments; and this article may be brought as another argument against it.

IV. A fourth Proof of a subterranean Reservoir of

water may be deduced from Lakes.

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Or these there are several forts, each tending to prove the point in question, as, first, Those which receive a great quantity of water, either from rivers or other means, but externally emit none; fecondly; Those that send forth a great quantity of water, but outwardly receive none; thirdly, Those that neither increase nor decrease, notwithstanding the difference of seasons, or the quantity of water carried off by evaporation. In each of these cases there must be a subterraneous exit, or else an internal supply; and when it has been proved, that there are some of these Lakes in almost every part of the world, it must be allowed that the refervoir which supplies them must be equally extensive with themselves, or that there is a collection of water which extends under the whole furface of the earth.

Or the first fort of Lakes are the following, reckoned up by Varenius, (System of Geog. p. 280.) 'In the foregoing proposition we observed that the Lake 'Titicaca discharges a river into a smaller called Paria, which therefore may be referred to this class, viz. to 'fuch as receive rivers but emit none. Asphaltites, which is also called the Dead Sea, re-'ceives the river Jordan, but emits none: Its length, 'from north to fouth, is feventy German miles, and 'its breadth five, as some make it. There is one in the leffer Asia. There is a small one in Mace-'donia, called Jana, which receives two little rivers. One in Persia near Calgistan. The lake Soran, in "Muscour, receives two small rivers. The river 'Gbir, in Africa, is reported, by Leo Africanus, to 'lose itself in a lake, and some maps so represent it, 'but others join it to Nubia.' Peter Martyr in his History of the West-Indies, p. 135, speaking of Hispaniola, fays, 'That about threescore miles distant from the chief city of St. Dominick, there are certain high mountains, upon the tops whereof is a Lake or flanding Pool of fresh water three miles in compass, and well replenished with divers kinds of fishes. Many small rivers and brooks fall into it. It hath on paffage out, but is on every fide inclosed with the tops of mountains.' Under this head we may reckon a Lake mentioned by Du Halde, in his Description of the Empire of China, Vol. I. p. 20. ' This vast Lake [named Tong-ting-Hu, in the province of Huquang is remarkable for the greatness of its circumference, which is above 80 french leagues, and the · abundance of its waters, especially in certain seasons, when two of the largest rivers in the province, · fwelled with the rains, discharge themselves into it; and when it disembogues them, one can scarce per-'ceive it to be diminished.' To this article also may be referred what has been already faid concerning the two leffer feas or lakes, called the Caspian; one in Asia, the other in America, p. 137, 8.

Or the second fort of Lakes, or, those which send forth a great quantity of water but outwardly receive none, take the following account from Varenius (System of Geog. p. 278) 'There is an infinite number of these Lakes and most large rivers flow from such, as out of cisterns;—of the smaller fort are the following, the Lake Wolga, at the head of the river Wolga; the Odoium at the head of the Tanais; the Adac, from whence one of the branches of the river Tigris flows; the Ozero [or White Lake] in Muscovy, that gives fource to the river Shacksna, which is poured into the Wolga, and many more little ones; we shall here only reckon some of the larger fort that are more remarkable. The great lake Chaamay in the latitude of twenty six degrees north, not far from

India to the eastward of the river Ganges; out of this lake flow four very large rivers, which water and fertilize the countries of Siam, Pegu, &c. viz. the Menaw, the Asa; the Caipoumo, and the Laquia. Some maps exhibit a small river that runs into this lake. The lake Singbay, upon the east border of China, fends out a great river fouthward, which being joined to another, enters China. The lake Titicaca, in [Los Charcas] a province in fouth America, is eighty leagues in circuit, and emits a large river, which is terminated in another small lake, and is no more feen. There are feveral towns and villages discovered about this lake. The lake Nicaragua, in a province of the same name, in America, is only fourteen German miles from the Pacific, or fouth feat and above one hundred from the Atlantic, into which it is discharged at broad flood-gates. The lake Frontena, in Canada; out of which issues the river of St. Lawrence. The lake Annibi, in Afia, in the latitude of fixty-one degrees.' And after p. 282, where the Author gives an account of Lakes that both receive and emit rivers, it is evident that the quantity of water emitted by some is far superior to what is received: and in others the quantity received superior to what is emitted; fo that there must be subterraneous supplies and exits.

THE next quotation I shall cite may serve both for this second article and also for the last, viz. for those Lakes that neither increase nor decrease, notwithstanding the difference of seasons and the quantity of water carried off by evaporation: It is from Acosta's History of the Indies, Book iii. chap. 16, 'It is a question often asked, 'Why there are so many Lakes in the tops of these mountains, into which no river enters, but contrary'wise many great streams issue forth, and yet do we

· scarce see these lakes to diminish any thing, at any · feafon of the Year. To imagine thefe lakes grow by the snow that melts, or rain from heaven, That doth not wholly fatisfy me; for there are many that have not this abundance of fnow, nor rain, and yet we fee no decrease in them: which makes me to beblieve they are fprings which rife there naturally; although it be not against reason, to think that the fnow, and rain help fomewhat in fome feafons, 'These Lakes are so common in the bigbest tops of the " mountains, that you shall hardly find any famous ri-· ver that takes not its beginning from one of them. Their water is clear and breeds little store of fish. and that little is very small, by reason of the cold which is there continually. Notwithstanding some of these lakes be very hot, which is another wonder. At the end of the valley of Tarapaya near to Potozi, there is a lake in form round, which feems to have been made by a compass, whose water is extreamly hot, and yet the land is very cold: they are accustomed to bathe themselves near the bank, for else they cannot endure the heat being farther in. In the ' midft of this lake there is a boiling of above twenty feet square, which is the very spring, and yet (not-' withstanding the greatness of this spring) it is never ' feen to increase in any fort: it seems that it exhales of itself, or that it hath some hidden or unknown 'iffue: neither do they fee it decrease, which is another wonder, although they have drawn from it a ' great stream, to make certain Engines for metal, confidering the great quantity of water that iffueth forth, by reason whereof it should decrease.' the greatest Lake of this kind in America, and indeed in the whole world, is the Lake Parime, lying directly under the Equator. 'It is (as Varenius says in his Syft. Geog. p. 278) in length from east to west, about

105 German miles, and in the broadest place 100 * miles over or thereabouts; fo that it may be compared with, if it do not exceed, any lake in the world for magnitude; yet it neither receives nor emits any rivers.' Gordon in his Geographical Grammar speaking of Scotland, writeth thus, page 204, 'Towards the north-west part of Murray is the famous Lough-Ness, which never freezeth; but retaineth its natural heat, even in the extreamest cold of winter; and in many places this lake hath been ' founded with a line of 500 fathoms but no bottom found. Nigh to Lock-Ness is a large round Moun-'tain [called Meal-fuor-vouny] about two miles of pere pendicular height from the surface of the Ness; upon ' the very top of which mountain is a lake of cold fresh ' water often founded with lines of many fathoms, but 'never could they reach the bottom. This lake, having no visible current running either to it or from 'it, is equally full all feafons of the year; and it never 'freezeth.' Sir Robert Sibbald in his Scotia illustrata, p. 22, fays 'That there are various Lakes in Scotland, especially in the bighest places, which neither emit 'nor receive rivers, and yet are full of water;' and concludes 'that fuch must be supplied by sources ' from beneath, at least with a quantity of water equi-'valent to what is carried off by the heat of the Sun.' In Kircher's Mundus Subterraneus, Lib. v. Ch. 4.

In Kircher's Mundus Subterraneus, Lib. v. Ch. 4. there is an account of feveral other Lakes of each of the above-mentioned kinds, and full proof that they derive their origin from, and are continued by, fubterrene fources. And though probably some of these Lakes are maintained by rivers that run under-ground or by springs that issue out at their bottoms, yet, as we have already shewed (p. 120, &c.) that the Springs and Rivers which appear above ground owe their supplies to

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an internal Reservoir, it must much more strongly follow that these covert Springs and Rivers are owing to the same, and therefore that the Lakes, which are supported by them, plainly shew that there must be a subterranean Reservoir of water.

V. A fifth Argument in proof of an Abyss of water beneath the earth may be drawn from the consideration

of some phanomena attending Earthquakes.

An account of which I shall transcribe from Dr. Woodward's Nat. History of the Earth; the truth of which every person that is at all conversant in the history of Earthquakes cannot but know; and indeed the effects of the late dreadful shock of the earth at Lisbon, which extended themselves (through means of the agitation of the waters of the Sea and the Abyss) to the four quarters of the world, being at present fresh in the memory of almost all now living, will bear ample testimony to the truth of what the Doctor afferts, Nat. Hift. p. 133, 'That this subterranean · Heat or Fire, which thus elevates the water out of the Abyss, being in any part of the earth stopped, and · fo diverted from its ordinary course, by some accidental glut or obstruction in the pores or passages through which it used to ascend to the surface: and being by that means preternaturally affembled, in greater quantity than usual, into one place, it causeth a great rarefaction and intumescence of the water of the abyss, putting it into very great commotions and diforders: and at the fame time making the like effort upon the Earth, which is expanded upon the face of the abyss, it occasions that agitation and concussion of it, which we call an Earthquake. That

[•] See an Account of these effects, and how extensive they were, in Phil. Trans. for the year 1756, Vol. XLIX. Part 1. §. ii.

this effort is in some earthquakes so vehement that it fplits and tears the Earth, making cracks or chafms f in it some miles in length, which open at the inftants of the shocks, and close again in the intervals betwixt them: nay, it is sometimes so extreamly violent, that it plainly forces the superincumbent Strata; breaks them all throughout, and thereby perfectly undermines and ruins the foundations of them; fo that these failing, the whole Trast, as soon s as ever the shock is over, sinks down to rights into the Abyss underneath, and is swallowed up by it, the water thereof immediately rifing up, and forming a lake in the place where the faid tract before was. That feveral confiderable tracts of land, and fome with cities and towns standing upon them; as 'also whole mountains, many of them very large, and of a great height, have been thus totally swallowed up. 'That this effort being made in all directions indifferent-'ly; upwards, downwards, and on every fide; the fire dilating and expanding on all hands, and endeavouring, proportionably to the quantity and strength of it, to get room, and make its way through all obstacles, falls as foul upon the water of the Abyss beneath, as upon the earth above, forcing it forth 'which way foever it can find vent or passage; as well through its ordinary exits, wells, fprings, and the outlets of rivers; as through the chaims then 'newly opened; through the Camini or spiracles of * Ætna, or other near Vulcanoes; and those Hiatus's at the bottom of the sea, whereby the Abyss below opens into it and communicates with it. the water resident in the Abyss is, in all parts of it, ftored with a confiderable quantity of heat, and more especially in those where these extraordinary aggregations of this fire happen, fo likewife is the water which is thus forced out of it; infomuch, that when thrown forth, and mixed with the waters of wells, of fprings, of rivers, and the fea, it renders them ' very fenfibly hot. That it is usually expelled forth ' in vast quantities and with great impetuosity; insomuch that it hath been feen to fpout up out of the deep wells, and fly forth, at the tops of them, upon the face of the ground. With like rapidity comes it out of the fources of rivers, filling them fo of a ' fudden as to make them run over their banks, and overflow the neighbouring territories, without fo " much as one drop of rain falling into them, or any other concurrent water to rife and augment them. 'That it spues out of the chasms opened by the Earthquake, in great abundance: mounting up, in ' mighty streams to an incredible beight in the air, and this often-times at many miles distance from any ' sea. That it likewise flows forth of the Volcanoes in vast floods, and with wonderful violence. That it is forced through the Hiatus's at the bottom of the fea with fuch vehemence, that it puts the fea immediately into the most horrible disorder and perturbation imaginable, even when there is not the leaft ' breath of wind stirring, but all, 'till then, calm and 'fill; making it rage and roar with a most hideous and amazing noise; raising its surface into prodigious waves, and toffing and rolling them about in a very strange and furious manner; oversetting ships in the harbours, and finking them to the bottom; with many other like outrages. That it is refunded out of these Hiatus's in such quantity also, that it ' makes a vast addition to the water of the sea; raising it many fathoms higher than ever it flows in the highest tides, so as to pour it forth far beyond its ' usual bounds, and make it overwhelm the adjacent ' country; by this means ruining and destroying towns and cities; drowning both men and cattle; breaking

the cables of ships, driving them from their anchors, bearing them along with the inundation feveral miles up into the country, and there running them aground; stranding whales likewise, and other great 'fishes, and leaving them, at its return, upon dry-land.' And again, Nat. Hist. of the Earth illus. p. 104. 'Now fince there are, on record, earthquakes, and 'indeed not a few, by which the globe, for many bundred miles together, has been shaken, at the very ' same moment of time, it thence follows, that the waters, which caused those concussions, were not only equal in extent to that space of the Globe which was fo shook, but one fluid body continued, and not 'divided into parts or distinguished into regions, fo that particular portions thereof should be confined ' each to its proper cavern. Nay, there want not infrances of fuch an universal concussion of the whole "Globe," as must needs imply an agitation of the whole abyss. For an effect of so vast an extent 'could never have proceeded but from a cause equally extensive; such as might affect the whole earth at once; which cannot be done without such an orb of water, as I have described. We have had accounts from writers of the most unquestioned fideli-'ty; and even from eye-witnesses, that there have been earthquakes, in our own times, wherein the 'motion, given to the earth at the feveral shocks, ' perfectly resembled that of the waves of the sea raised by a strong wind. Whoever shall rightly attend 'to this phænomenon in particular, he must, not only acknowledge that the earth contains in it an 'abyss of water, and is moved by the same : but must also readily agree with me that this terrestrial part L 4

See RAY's Physico-theological Discourses, p. 13.

of the globe is nothing but a thin shell, which includes in it, closely on every side, an immense mass.

of waters, and whenever those waters happen to be put into any extraordinary motion, the earth is by

them moved and agitated just in the same manner as

the inclosed waters are moved and agitated.

VI. That there is an Abyss of waters beneath the earth, may be still further shewed from the quantity of water that has been discovered in the inside of the earth, in opening the strata either for Stone, Coal, &c. in digging for wells, &c. in searching after minerals, ores, &c. from sudden and accidental eruptions of water out of the bowels of the earth; or from discoveries of subterranean waters that have been made by any other means, either accidental or designed, that do not properly come under the heads I have already discussed.

perly come under the heads I have already discussed. Mr. Hutchinson in his Observations on the earth (see Vol. XII. of his works, p. 331.) says, 'It is hardly credible how great a quantity of water will be fometimes flung upon miners, when they come to break up strata of stone, that have in them many of these cracks, that are so small that they are hardly discernible. These are indeed the natural conveyances of water: and, when once they are opened, it runs incessantly. I have observed such an irruption of water in vast quantity out of Stone, that, exempting those cracks, is much too dense and close to let any, the least, humidity pass. profusion of water that sometimes ensues the breaking up of the strata in Coal-pits is well known to all that are in the least conversant in that affair; and what amazing quantities are drawn off from deep mines, either by drains or levels, or raifed by engines, is also well known: Nay, in digging common wells and ponds, in places where there are no Springs above

ground, it frequently happens, that fuch a glut of water issues forth as to endanger the lives of the workmen. Of this Dr. Shaw gives us a remarkable instance in his Travels, p. 135, 'The Villages of Wadreagg [in the eastern province of Barbary] are built in a plain, without any river running by them, and are supplied in a particular manner with water. 'They have, properly speaking, neither fountains nor rivulets; but by digging wells to the depth of an bundred and sometimes two bundred fathom, the inhabitants never fail of obtaining a plentiful stream. And to this purpose, they dig thro' different layers of fand and gravel, 'till they come to a fleaky kind of stone, like unto Slate, which is known to lie immediately above The [Bahar taht el Erd] Sea below ground, as they feem to call the Abys. This is easily broken through; and the flux of water which fol-'loweth the stroke, rifeth generally so suddenly and in fuch abundance, that the person let down to perform the operation, hath sometimes been overtaken ' and fuffocated by it, tho' raised up with the greatest Of sudden Eruptions of water from 'dexterity.' out of the bowels of the earth there are several accounts recorded in history, some that have overslowed whole countries, others large towns and cities, others villages: of these the reader may see several accounts in Kircher's mundus subterraneus; Ebrartus de Belemnitis Suevicis Præfamen; Phil. Trans. &c. I shall, cite one account from the last mentioned Treatise in order to give the reader an idea of fuch Eruptions, No. I. p. q. 'In the beginning of July 1678, after some gentle ' rainy days, which had not fwelled the waters of the Garonne more than usual, one night this river swelled 'all at once fo mightily, that all the bridges and 'mills above Tolouse were carried away by it. In the plains which were below this town, the inhabi-

tants, who had built in places which by long experience they had found fafe enough, from any former inundations, were by this furprized; fome were drowned together with their cattle; others had not · faved themselves but by climbing of trees, and geting to the tops of houses; and some others who were looking after their cattle in the field, warned by the noise which this horrible and furious torrent of water (rolling towards them with a swiftness ' like that of the sea) [in Britaigne he means] made * at a distance; could not escape without being overtaken, though they fled with much precipitation: This nevertheless did not last many hours with this At the same time exactly, the two violence. rivers only of Adour and Gaue, which fall from the ' Pyranean hills, as well as the Garonne, and fome other little rivers of Gascoyne, which have their fource in the plain, as the Gimone, the Saue, and the Rat, overflowed after the same manner, and caused the same devastations. But this accident happened not at all to the Aude, the Ariege, or the · Arise, which come from the mountains of Foix, only that they had more of the same than those of the · Conserunt, the Comminge, and the Bigorre. M. Mar-· tell (by the order of M. Foucault) hath fearched after the cause of this deluge, being affured that it must · have had one very extraordinary: for all who had · feen the circumstances agreed, that it had rained indeed, but that the rain was neither fo great, nor · lasted so long, as to swell the rivers to that excess, or to melt the fnows of the mountains. But the nature of these waters, and the manner of their flowing from the mountains, confirmed him perfectly in his · fentiments. For, 1. the inhabitants of the lower · Pyraneans observed, that the water flowed with vio-· lence from the entrails of the mountains, about which

there were opened several channels, which forming fo many furious torrents tore up the trees, the earth, and great rocks, in fuch narrow places where they found not a passage large enough. The water also which spouted from all the sides of the mountain in innumerable Jets, which lasted all the time of the greatest overflowing, had the taste of Minerals. 2. In some of the passages, the waters were stinking (as when one stirs the mud at the bottom of the mineral water) in fuch fort that the cattle refused to 'drink of it, which was more particularly taken no-'tice of at Lomber, in the overflowing of the Saue (which is one of the rivers) where the horses were 'eight hours thirsty before they would endure to drink 3. The Bishop of Lombez having a desire to cleanse his gardens, which the Saue passing thorough by many channels by this overflowing, had filled 'with fand and mud; those which entered them 'felt an Itching, like to that which one feels when one bathes in Salt-water, or washes oneself with fome ftrong Lixivial. This Itching could not be produced by either rain or fnow water, but by 'Some mineral Juice, either Vitriolick or Aluminous, 'which the waters had dissolved in the bowels of the ' mountains, and had carried along with it in passing For these out through those numerous crannies. reasons M. Martell believes the true cause of this Overflowing to be nothing else but subterraneous I might here add an account of the Rivers that are known to run wholly under-ground, and even of the Cataracts that have been discovered there (of which Herbinius in his Dissertationes de admirandis mundi Cataractis, supra & subterraneis, &c. gives a description) but to avoid prolixity shall conclude with observing, that the deeper we penetrate into the earth, the greater quantity of water is met with, and that generally this water breaks forth in such a manner as manifestly to shew that it is raised by a power from underneath, thereby plainly indicating its subterranean

origin.

Thus I have produced several arguments to prove that there is an Abys of water beneath the earth; and several others might be brought; but these may more naturally be introduced under some of the subsequent heads. For, I would observe here, once for all, that there is such a close connection between the several parts of the subject I am treating of, or the Heads I have been obliged to divide it into, that very often one and the same argument (or at least with the help of a sew additional sentences) will prove two or three of these Heads, but yet is more immediately applicable to one, I shall therefore dispose of it under its proper Head, and as far as it affords proof for other particulars, deduce them by way of corollaries or conclusions.

But before I quite finish the Article I am now upon, it may not be amiss to endeavour to shew what the Form and what the Size of this Abyss may be.

From what has been already faid (p. 134) it appears that the Abyss and the Ocean are in conjunction with each other, and therefore that the Abyss is not divided into separate parts or distinguished into large detached caverns (as some have imagined) but is one continued and united body of water, and equal in extent to the circumference of the lower part of the shell of the earth, and lying immediately under it; as is alfo evident from what is faid page 151. And therefore as the Shell of the earth is of a round form, we may justly esteem the Abyss to be so likewise, as it is represented in the Plate by G. H. And, that the Abysis is really of this form we have better proof than any that can be deduced from natural evidence, for He who made it and the whole earth hath affured us that it is so, as I have shewed page 26; and in order to strengthen the comments there made upon Scripture, and to add authority to the justness of them, I shall cite the opinion of the celebrated Stackbouse in his History of the Bible, p. 125. I select this writer (out of feveral that might be brought) not only because he has determined the Form of the Abyls, but has spoken of the Size of it, and given a calculation by which the reader may judge of the quantity of water contained therein. 'Tis certainly (fays he) more than probable (because a matter of divine Revelation) that there is an immense body of water enclosed in the center of the earth, to which the Psalmist plainly al-'ludes when he tells us, that (Pfal. xxiv. 2.) God founded the earth upon the seas, and established it on the floods; that (Pfal. cxxxvi. 6.) be stretched out the earth above the waters; that (Pfal. xxxiii. 7.) be gathered up the waters as in a Bag (so the best translations have it) and laid up the Deep as in a Storebouse. Nay, there is a passage or two in the proverbs of Solomon (where Wisdom declares her Antiquity, and ' pre-existence to all the works of the earth) which fets before our eyes, as it were, the very Form and Figure of this Abys; (Proverbs viii. 27, 28.) When ' he prepared the heavens, I was there, when he fet a · Compass upon the face of the Deep, and strengthened the ' Fountains of the Abyss. Here is mention made of the Abyss and of the Fountains of the Abyss; nor is there any question to be made, but that the Foun-'tains of the Abyss here are the same with those, which Moses mentions, and which, as he tells us, were broken up at the Deluge. And what is more 'observable in this Text, the word, which we render 'Compass, properly signifies a Circle or Circumference, or an Orb, or Sphere: fo that according to the testi-'mony of Wisdom, who was then present, there was

[158]

in the beginning a Sphere, Orb, or Arch, set round the Abyss, by the means of which, the fountains thereof were strengthened; for we cannot conceive; · how they could have been ftrengthened any other way, than by having a strong Cover or Arch made over 4 them. If, such then be the form of this Abyss. that it seems to be a vast mass, or body of water, · lying together in the womb of the earth, it will be no hard matter to compute what a plentiful supply ' might have been expected from thence, in order to effect an universal Deluge. For, if the Circumference of the earth (according to the lowest com-• putation) be 21000 miles, the diameter of it (accordding to that circumference) 7000 miles, and confequently from the superficies to the center, 3500 * miles; and if (according to the best account) the s highest mountain in the world (taking its altitude from the plain it stands upon) does not exceed four * perpendicular miles in height; then we cannot but conclude, that, in this Abyss, there would be infiinitely more water than enough, when drawn out upon the furface of the earth, to drown the earth, to a far greater height than Moses relates.'



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SECONDLY,

I AM now to prove that the whole Earth was covered to an immense height by this Subterranean Water, or that the Deluge, in the time of Noah, was universal; the Fountains of the Great Abyss having been broken up, and the water thereof elevated above all the high Hills under the whole heaven.

AND, first, to begin with proofs deducible from the circumstances of things on or near the Surface of

the Earth.

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I. The Division of the surface of the earth into Mountains, Hills, Combs, Dales, Vallies, &c. is so obvious and striking, that sew or none but must have observed it; though probably but sew have seen how far this regularly irregular Division (as I may justly call it) was owing to, and is a proof of, an universal Flood, or that the surface of the earth has been covered to a great height by an inundation of water. I shall therefore enlarge on this article, and point out the evidence deducible therefrom.

Mountains and Hills have generally on all fides a regular descent or inclination from their tops, greater or lefs, longer or fhorter. And when separately confidered, and without attending to every little inequality, may be faid to be of a conical or pyramidal shape; and when many lie close together, or are continued in a direct chain through whole countries, they may be faid to be of a prismatical form. point therefore to be decided is, Whether this be their original shape, That which was necessarily produced by, and in which they have always remained fince, the first situation of their materials in the places they now stand?—Or, Did they obtain their present form afterwards, i. e. were their original materials modelled, framed, or brought into this shape by the action of some outward Cause? - And what was that Cause?

THAT Mountains were not originally of this shape feems evident from the manner in which their materials or constituent parts subsided and at present lies they being disposed in strata, beds, or layers (whether of stone, clay, chalk, &c.) of equal thickness throughout, and regularly lying upon each other in a flat, level, or horizontal polition; which situation of all others feems the least proper for disposing such materials into a conical or prismatical figure. Did their strata or layers stand one against another in a floping posture like the ridge of a house, or even perpendicularly upright, it might more probably have indicated their present shape to have been the original; but fince they are posited in a flat, level situation, (which is the most different from any of the upright forms) it feems plainly to shew that their present shapes were not the original, but are owing to some Which is further evident from external force. hence, That in mountainous countries, which confift of the same kind of strata, the strata in each mountain shall exactly answer or correspond together in every respect, -in species, in colour, in depth, in thickness, in situation and in their contents. So that suppose, the 1st [under the vegetable mould] or uppermost stratum to be of a whitish coloured Sandstone, one yard thick; the 2d a red Marl, two yards; the 3d a blue Lime-stone, containing shells, teeth, bones, &c. of particular kinds, one yard thick; the 4th a blue Clay, containing native fossils, such as felenitæ, pyritæ, &c. three yards thick; the 5th a grey Flag-stone, eight yards thick; the 6th a stratum of Coal, [with its usual attendant, a black clayey flate, replete with plants of all forts | two yards thick; the 7th a Rag-stone, ten yards thick; the 8th a Freestone, containing a great variety of shells, twelve yards thick; the 9th a red Sand-stone, sixteen yards thick;

the 10th a stratum of grey Lime-stone, containing a great variety of corals, shells, &c. reaching to the bottom of the mountain. Now in the same order and in the same horizontal position you shall find similar strata in each mountain throughout such a country. The question therefore is, whether they were not all once united, or the strata continued throughout in one entire body, without any of those Eminences we call Mountains, or those Hollows called Vallies? And if so, then the present mountainous form was not the original, or these mountains were not coeval with, or any ways owing to, the disposition of their materials or the settlement of their strata. Now in order to shew that the strata in these mountains were once wholly continued, let a person first examine a single chain or

" If any person should be desirous of examining the strata of the earth in a mountainous country, and should not find any great variety of strata, or even but one single stratum, yet upon strict inspection or rather at first sight he will perceive that this single stratum is divided into a great number of lesser strata or small layers, which will be easily distinguishable from each other, either by their colour, depth, thickness, or more remarkably by their Contents or the fossil bodies they contain, one layer abounding with one species of shells, another with a different; another layer containing bones and teeth of sisses; another corals of various kinds, &c. &c. &c. so as to afford him evident marks by which he may distinguish one layer from another almost as readily as if there had been strata of different substances.

In the description of the above supposed Mountain the Strata are not represented as lying according to their specifick Gravities, for however commonly received the opinion is that they do so lie, yet I never could find them in this situation in any place that I have seen. And the several experiments and observations that have been made upon the strata of the earth, when opened to the greatest depths, shew that they do not lie according to their specifick gravities; see in particular Philosop. Transac. No. 336. Art. xi. No. 250, Art. ii. No. 360, Art. iv. No. 391, Art. i. VARENIUS'S Geography. Lib. I. Cap. vii. Propos. 7. HAUSKBEE'S Experiments, p. 317, Experiments. Luidii Lythophil. p. 1101

ridge of them, runing for ten, twenty, or thirty miles only, [and they fometimes continue for feveral hundred in which chain particular mountains are diffinguishable from each other only by the separation. or vacant spaces between their tops, reaching to different depths and at various distances; and suppose, upon examination, he should find that the strata in each of the tops were of the same kind, colour, thickness, &c. (as above described) and lying in the same polition, and only parted from each other by the vacant spaces between their summits, and that the strata underneath, in the body of the mountain, were quite whole and entire, lying in the same direction or parallel with those in the tops, Would he not conclude that the uppermost strata were likewise once whole and united [which are now only discontinued by the comparatively small vacant spaces between the summits of the mountains] as well as those that are underneath? Especially, if he was to remark, that, where the separation between the tops of some of the mountains was not so great or deep as in others, the strata that did not appear in the rest, would appear in these; or suppose the depth of the space between some of the mountains to be no more than thirty yards or to reach down to the stratum of Free-stone (in the above description) but that in other of the vacant spaces between the mountains even this stratum of Free-stone should not be found, or, as is frequently the case, only a part or half of it be wanting, Would he not conclude, that the other part was formerly subsisting in its due place and order? And if he would judge thus of this stratum, doubtless he would determine the same of the rest, and that the vacant spaces between the tops of the mountains throughout this chain were formerly filled up with their respective strata. Judging then thus of this fingle Ridge of mountains, let him now

extend his view on every side, and behold how exactly parallel the fame kind of strata in the adjacent mountains lie with their similar ones in this chain. and he will as readily conclude that they were all once in conjunction and the vallies between them filled up with corresponding strata, as those vacant spaces were between the tops of the first chain of mountains he examined. In short, if a person was to see the broken walls of a palace or castle that had been in part demolished, he would certainly conclude that the breaches or vacant spaces in those walls were once filled up with fimilar substances, and in conjunction with the rest of the walls, and could easily with his eye fee the lines in which the walls were carried, and in thought fill up the breaches and re-unite the whole: And in the same manner if a person was to view the naked ends or broken edges of the strata in a mountain on one fide of a valley and compare them with their correspondent ends in the mountain on the other fide of the valley, he would manifestly perceive that the space between each was once filled up, and the strata continued from mountain to mountain. So that the present conical shape of mountains was not coeval with their substances or with their inward and original form; they being primarily of no outward form, if I may fo fay, or rather there were once none of those Eminences upon the earth which we now call Mountains; for when the strata of the earth were whole and entire, and in conjunction with one another, and the vacancies that now occasion vallies, dales, &c. filled up with their respective strata, the earth must have been of one spherical form without mountains, hills, dales, vales, &c. and all the strata must have lain originally horizontally upon one another, or rather, to speak philosophically, concentrically with each other. And what further shews, That mountains

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are only Eminences of the earth, caused by the excavation or scooping out of the substances or strata that formerly occupied those Hollows, which we now call Vallies, Dales, Combs, &c. is this, that it may be demonstrated, That the origin of mountains cannot be owing to any Elevation or Depression of their strata; though most writers have attributed it to this cause, and supposed them to have been produced by Disruptions from within the earth, occasioned by the breaking out of subterranean fires, earthquakes, &c. whereby the strata became elevated in some places, and depressed in others: but this could not have been the case. For, the strata of Mountains in the inland countries (and fuch mediterranean Eminences are properly to be termed Mountains; Hills being less, and fituated at a distance from mountains, and nearer the fea) are generally, and if the highest or most inland in the Continents or Islands on which they stand, are, I may venture to fay, always posited in an horizontal direction, or but very little inclining therefrom, and even this inclination accountable from other causes than Difruptions, as will be feen in the process of this treatife." Now the strata of Mountains being thus horizontally placed, which also appearing to have been their original position, (as will more clearly be shewn

Thus much I can fay for certain, that the Strata in some of the highest ridges of Mountains in England and Wales are horizontally posited; which is a plain proof that Mountains in general might have been, and that these in particular really were, formed without any elevation or depression of the strata: and hence also it appears that the horizontal position is the original and natural situation of the strata. And in such mountainous places where I have observed the strata to be somewhat inclined, it has generally been where there are large and deep vallies, steep precipices, naked rocks for a great extent of ground, and many other such like proofs that the Agent (the water, as will be seen hereaster) that tore out the hollows of the dales and vallies, passed off with great rapidity and acted with great force upon

hereafter) is an undeniable proof; that they have not been displaced, and therefore that these eminent parts of the earth were not owing to any Elevations or Depressions of their strata; for had they been produced by either of these means the strata must have been inclined in various angles, and placed in the most different directions from the horizontal. Besides, had Mountains been owing to the Elevation or Depreffion of their strata, the outsides and forms of Mountains would have been shaped or in a great measure have answered the inward position of the strata; whereas this is feldom the case; and in Mountains where the strata are horizontal, never can be, provided those Eminences are of the common pyramidal or conical shape; but where such have large extensive plains or much level ground upon their tops, the outward shapes of these indeed usually answer or correspond with the inward level fite of the strata; but such flat eminences as these are not what we generally underfland by the term Mountains, and ought rather to be called, as they commonly are, high Plains or Downs. And in fuch mountains or rather Hills where the strata are inclined, I have feen the outward form very M 2

the subjacent strata; in doing which it would naturally (in such places where there was a variety of strata) wash and carry away the more soft and brittle strata, and by this means undermine, and so incline, the superior beds of stone; &c. and in many places I have remarked, particularly upon the sides of steep mountains, that this inclination of the strata is but for the depth of some seet, or what I may call, superficial; and that the beds of stone upon the top of the mountain are but little, or not at all, inclined; and in the body of the mountain are borizontally posited: which plainly shews, that the upper strata only have been moved, and moved too by some outward cause, and not the whole body of the mountain, either by elevation or depression of the strata.

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different from what one might expect from the inward inclination of the strata, nay, sometimes directly contrary to it. It being then thus certain, that the present outward form of Mountains was not owing to, either, the inward disposition, or present situation, of the strata, and that the vacant Spaces between the tops and sides of mountains were once filled up, it must follow, That these high and eminent parts of the earth were caused by some external Agent or Means that acted upon the outward surface of the earth, and which, by tearing off and carrying away the matter or strata that formerly occupied those places we now call vallies, left those Eminences standing, which we now call Mountains.

And that this was really the case will yet more manifestly appear, in tracing out what that Agent was that effected this, which is the next thing to be considered.

THAT the outward form of Mountains was owing to the action of some Fluid, which by softening and mollifying the parts gradually wore and tore away the circumjacent strata, is evident from the conical shape, regular flope or gradual descent of Mountains from their tops quite down their sides; and when we confider the bulk of a mountain, and the prodigious number of them upon the earth, there is no Fluid of a nature proper, and in quantity sufficient, for effect-And that Water was the Aing this but Water. gent is further evident, from the general tendency or inclination of the fides of mountains down towards the Sea, especially in islands and peninsulas, chiefly and more remarkably in fuch as are longer than they are broad; and in necks or promontories of land that jut out into the sea, and have water on both sides of them. So in the islands of Cuba, Hispaniola, California, Madagascar, Sumatra, Suconia, St. Christopher, and many

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others, there is a ridge or Chain of mountains run. ing directly through the middle, in a line with the length of those islands and peninsulas, gradually lessening and lessening with gentle declivities on each fide, tending outward or falling away down towards the two feas [not inward towards the land]. just in such a manner as Water descending from the tops of these ridges would naturally have torn and carried away the ground, and fo have formed regular descents on both sides; which descents generally continue for several miles underneath the sea; for it is a common observation with mariners that where the fhore lies nearly level or upon a gentle descent, that there the fea gradually increases deeper and deeper the farther you proceed from land; fo as plainly to shew that the ground underneath or the bottom of the ocean was formed after the same manner, and is only a continuation of that at Land: fince then these Descents or Declivities are at present in part covered with water, there can be no reason to doubt that this was the Agent that formerly covered and formed the whole. So in Promontories or parts of land that project into the Sea, where fuch are long and narrow, there is commonly a ridge or feveral ridges of mountains passing through the middle with gentle declivities on each side. Thus in Italy the Apennine mountains are continued lengthways through the middle of that country, and divide it in two parts, just in the manner (as it has been represented) as the back-bone of an animal does his body; fimilar is the situation of the mountains in Norway, Malacca, Corea, Cambodia, India within the Ganges, the South part of Africa for several hundred M 4

^{*} Kircher's Mundus Subterraneus, p. 97. Marsilli de la Mer, p. 11. Ray's Three physico theological Discourses, p. 27.

miles, and for as many in the fouth part of America, &c. And what is further remarkable in Promontories and fuch procurrent parts of land, they generally, and especially where there is an open and free Sea, gradually leffen and terminate in a point like a Wedge; which is exactly the form that water, retreating from the upper lands, and falling on each fide, would naturally shape and reduce it into. the effects of the water descending from the surface of fuch extensive parts of the earth, as large Continents are, would exhibit a different appearance of things from what they do upon islands and promontories; for in this case the water would take many and various courses, according to the greater number, distance, and irregular fituation of the Paffages or Inlets it had into the Abyss (which inlets we may suppose to be in fuch places where Seas and large Lakes are at prefent); and also according to the greater variety of the Strata it had to act upon (many of which strata would resist, and as many yield to, the force of the water; and some more, some less) so that under such manifold and disferent circumstances we might expect to find the Chains or Ridges of Mountains upon large Continents lying in many and various directions; and accordingly we to find them. But yet, in some degree, the outward form or furface of Continents and Islands would refemble each other; for upon both, and even where there were no remarkably great mountains, we might reasonably imagine, that the inland parts would be the highest, or more eminent than the maritime; for the water would act more strongly and tear off a greater quantity of the earth near the fea-coasts than higher up within the land; and this, for two reasons; -because the Passages into the Abysis lay nearer the sea-coasts, and thither the whole force of the water was directed; -and because all the water that covered the inland parts of the earth would flow over and act upon the maritime, and would bring along with it large fragments of rocks and a great quantity of rubbish, which by being driven upon, would wear and tear away, the land near the sea-coasts to a great degree; and therefore the mediterranean parts of Islands and Continents would be less, or but little, torn; and on this account, after the retreat of the water, be left standing highest. And this also we find to be fact: as is evident from the courses or falls of rivers; they generally, or indeed almost universally, taking their rise in or near the Middle of Continents and Islands, and flowing down towards, at last empty themselves into the Sea; and as it is certain that the fall of water is always from the higher to the lower grounds, fo it is as certain that the inland parts of the earth are higher than the maritime. Besides, it is a common observation that Mountains or inland Eminences are higher, and their descents or sides longer than those of Hills; which are generally shorter, but their sides or falls more fudden and precipitous: and that the strata in Mountains are horizontal, but in Hills (or leffer Eminences nearer the fea) are generally oblique All which is exactly confonant to what a Flood of water, retreating from the surface of the earth, would naturally produce; as is evident from what has been faid in the above paragraph: and the truth of the fact may be exemplified from the manner in which water moves when permitted to run out at an orifice at the bottom of a large and deep vessel; the chief action or motion of the water is at and near the orifice; while the furface is almost calm; and if the bottom of the veffel be made of any matter that will yield to the force of water, it will be most torn at and near the orifice, fince the current will be there strongest: And so, as the wafer, that covered the earth, retreated from the furface towards the apertures in its shell, the chief motion and violence would be at the mouths of the orifices that led into the abyss, whither the whole body of the water tended, and its whole force was exerted: and near these apertures the currents of water would be very strong and rapid, and which, by washing away the more foft and brittle strata, would undermine whole ridges of mountains and lay their strata in a floping posture, and by its continual action in passing over these ridges, would reduce and wear them less and less until they came to be of their present fize or Hills. But higher up or at a greater distance from the fea, the force would be proportionably diminished, as the quantity of water would be iefs and the current weaker; so that the strata in mountains are but little or not at all disturbed from their original horizontal polition; and as a less degree of force was exerted in forming them than in Hills, fo their descents would of course be longer and more gradually declining than those of Hills. And from what has been just faid, we may fee the propriety of Monf. Buache's plan of the disposition of Mountains, as laid down and delineated in Histoire de L' Acad. des Scien. An. 1752, Nov. 15. according to which, the greater or most remarkable Ridges of Mountains upon the feveral Continents of the earth take their rife in or near the middle of large Tracts of land; and are stretched out, as radii, from some bigb and extensive Plains; one of which plains rifes in Africa, another in Afia, two fmall ones in Europe, one in North and another in South America; and from each of these, respectively, iffue out, like horizontal shoots from a stock, several long Ridges or Chains of Mountains. -- In order to fee the reason of this from Experiments, and how far it would favour our present hypothesis, I provided a a

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large vessel of Glass, had several holes of different fizes bored in the fides about fix inches from the bottom, and stopped each with cork; I then filled the veffel with water; and having pulverized before-hand certain portions of the various strata of which the earth confift, as Stone, Coal, Clay, Chalk, &c. I permitted these substances to subside one after another through the water, 'till the terrestrial mass reached about two inches above the level of the holes: and the whole fettled in regular layers one upon another, just according to the disposition of things in the earth. I then (with the affiftance of another) pulled the corks out of each hole as nearly at the same time as possible. The water immediately began to drive the earthy parts through the holes, and scooped or tore the surface of the earthy mass in such a manner as that the deepest Hollows were near the Apertures, i. e. where the force was greatest, and the feveral furrows gradually less and less, towards the middle part; as the force of the water was proportionably diminished to its distance from the place where its most violent action was: So that at the greatest distance from the apertures, i. e. in the middle of the heap of the terrestrial mass there were no furrows at all, and that part remained the highest of all the rest, and answered to one of the above-mentioned high plains upon the furface of the earth: and from this middle-part there tended feveral ridges, between the furrows leading down towards the holes in the vessel, just in such form as the chains of mountains, which take their rife in or near the middle of some Continent upon the earth, and tend, like radii, from fome high inland plain towards their respective apertures in the Seas next adjoining. Besides; the strata in the middle-part of the terrestrial mass remained immoveable, and without the least alteration, but those near the apertures in the vessel, were bent and inclined, and in some parts confusedly mixt together, agreeably to the disposition of things in the earth, with respect to inland and maritime Eminences, as I have observed already. Thus do the phænomena on the surface of the earth, with regard to Mountains and Hills, higher and lower lands, both upon islands, peninsulas, promontories, and continents, exactly answer to, and manifestly shew forth, the effects of a Flood of Water which once covered the whole, and gradually retreated therefrom.

And this will be still more evident if we descend to a particular examination of the form, situation, and cause of *Combs*, *Dales*, *Vallies*, &c. It was necessary to speak somewhat of these before, but they deserve a separate and closer consideration than could hitherto have been conveniently bestowed upon them.

A Comb, a Glin, a Dingle, or a Gill, &c. (for it passes under different names in different parts of England) is a gradually increasing or gently declining Hollow upon the furface of the earth; the fides regularly floping down towards the middle part. are of various fizes; fome being not more (or even less) than 3 or 400 yards in length, 50 in breadth, and 20 in depth at their largest end; others there are that are three or four miles in length, a mile in breadth, and 4 or 500 yards deep; and others of all They generally begin at a ridge intermediate fizes. of mountains or hills, and tend down their fides towards the lower lands; their beginnings or upper parts are very small, in some places scarcely perceptible; and they gradually open or increase to some of the above-mentioned lengths, breadths, and depths. The strata in most of them are bare and visible, if not throughout the whole Comb, yet in some part or other, or rather in several parts; and the broken ends or edges of the rocks that project from each

fide generally answer each other to a surprising exactness; and near the beginning or in the upper parts of the Comb they almost touch and meet each other. and at the very beginning are united; and so leave no doubt to conclude but that the strata were once in contact or continued in parallel lines from fide to fide throughout the whole Comb. And this mutual agreement between the strata on each side of Combs evidently shews, that thefe and fuch like Cavities were caused by some outward Agent that acted upon the furface of the earth, and which by tearing off and carrying away the interjacent strata, left these Hollows, and were not owing to any inward difruption, or a force from beneath: for, had this latter been the case, it could not be but that the strata on one fide or other of Combs would always appear elevated or depressed, or some way or other altered. And it is further demonstrable that Combs and Gills were not owing to any inward difruptions, fince it is common to observe in such of them as have rapid rivers or firong currents of water runing through them,

y Sometimes indeed the strata on one side of a Comb are different both in kind and fituation from those on the other; but then the reason is evident upon the spot; as, first, either the Comb was formed in a place where the ends of different strata met, or in a deep fiffure, or two or three Combs happened to be formed near together, and by the fide of each other, and then the Agent that tore the largest has shelved off or inclined the strata of the larger towards the leffer, there being no strata on the back-part (on account of the cavity of the leffer Comb) to support it; or some such accident or other has made a difference, which will be at once manifest to a judicious spectator. And these accidents generally happen in hilly countries or fuch as are near the fea, where the water of the deluge, in its retreat from the furface of the earth, descended with violence and acted with great force; whereas higher up in the inland countries or near the mountains the Combs and Gills are generally very regular and exact, and the broken edges of the strata on each side tally and correspond to the utmost nicety.

that the strata at their bottoms are whole and entite, and lie parallel with those above; nay, when miners have occasion, in tracing or pursuing a vein of ore, to dig under Combs they find the strata beneath, as regularly placed and in the fame direction as those above, and where they are horizontal above they are horizontal below; which affords an undeniable argument that Combs were not formed by any Force from beneath, but by the operation of some outward Cause. And when we consider the general regularity, smoothness, gently sloping sides, and the gradually increasing length, breadth and depth of Combs or Gills, we can attribute the Cause of their formation to no other Agent than Water, that formerly covered the tops and ridges of the Mountains and Hills where these floping Hollows are now found, and which by descending from thence, gradually tore and furrowed the earth into so many alvei or channels, just in the same manner as water, falling in a fudden and great thunder-shower, and retreating from the hills above towards the sea or any great river, tears and wears channels in the ouze or mud upon the shore. ther mark,—that Gills and Combs were formed by currents of water—is the serpentine shape or winding course of such as are long and large, and the apparent causes of such deflexions or curvatures. For water descending from the mountain-tops would of course be diverted from a rectilineal motion (especially if it ran for any confiderable length) by reason of the different strata, or different constitution of the same strata, it acted upon; some parts being hard, others soft, fome having but few, others many and large cracks, &c. and according to the different circumitances of these accidents the course of the water would be varied, and the stream occasionally diverted from the parts that refisted most towards those that resisted less: and

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on the same account, there would be many and valrious streams rushing down the sides of the same mountain, and as these would be irregular and winding, two or more would frequently unite, particularly the lesser fall in with and join the larger; and of this there are manifest marks and the effects now remaining; for it is common to observe at such places where a long and large Comb begins to turn off, that there is a furrow or channel now visible upon the surface of the earth, and the Comb is deflected from its former course according to the angle in which this furrow meets it (allowing for the fize of the furrow) and also is proportionably broader and deeper according to the fize of this concurring channel; manifeltly shewing, that where the stream that formed this lesser furrow met the larger, that there the deflexion would naturally begin, the Comb be turned off, and enlarged. in proportion to the additional force of the Current that formed this leffer channel. Many such observations as these might be made, if we were to consider particularly and minutely the form and fituation of the mountain or hill in which the Comb lies, the constitution and position of the strata within, the course of the fiffures, the shape of the valley beneath, the diftance of the fea, or any great lake, &c. from each and all of which many and different proofs might be drawn, plainly indicating, that Combs were formed by currents of water; but these are easier to be seen and discovered by a spectator than to be described to a reader; and they will be very evident to any one that has had but the hint given him that Combs and Gills were channels tore in the earth by the descent of water from the upper lands. And what has been faid above in relation to Gills may in a great measure be applied to Dales; which begin at the end of two or more Gills, and gradually increase in length, breadth, and depth, in proportion to the number and fize of

the Gills that lead into them; just in the same manner, and as evidently by the same means, as the larger Combs were increased and opened by the streams of water that tore the leffer channels that enter into As the Dales fall off from the mountains, and meet or unite at a greater or less distance. a still larger Hollow presents itself; which gradually opens and dilates as the former; and constitutes what we call a Valley; of greater or less extent and dimension according to the number and fize of the Gills and Dales that descend into it. at a great distance from the mountains, two or more vallies unite, and open into a wide extensive low-land Plain, or rather, a gently declining country; which adjoins to the Sea-shore; the bottom of which (especially if it is of a foft yielding nature, not rocky and stoney) is of a fimilar form, continues the fame declivity, or gradually grows deeper and deeper 'till it ends in an unfathomable Abyss. And thus does the Whole clearly point out the effects of a Flood of water that formerly covered the mountain-tops, and retreated therefrom down to, and even beyond, the very depth of the Ocean; forming (in its passage from the furface of the earth to the center) high up, where its force was weakest, the lesser channels or Gills and Combs: and where several streams united, the Dales; and where the currents, that made the dales, met and joined their forces, hollowing out the Vallies; and were the torrents that scooped out vallies opened and expanded themselves, there forming the wide low-land Plains, gradually declining Sea-shore, and the sloping bosom of the Ocean.

Having thus, fafely and truly, I hope, conveyed the reader from the tops of the highest Mountains down to the bottom of the deepest Seas, we will now take a review of the paths we have trod, and draw some suitable conclusions from the whole.

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I. From what has been faid, we may fee the error of his Lordship's opinion concerning the origin of mountains, p. 88, viz. 'That when the Fountains of the great Abyss were broken up, and an immense Hollow was excavated out of the earth from pole to pole, as 'a bed for the fea to lie in; when the rocks, and the fands, and the shells, and the earth, that were taken 'thereout, were thrown upon the land, and raised in 'Mountain upon Mountain, so as to affail the skies and invade the region of the clouds; when Promon-'tories, and Capes, and Head-lands started up in an 'irregular order, &c; of as it is elsewhere described 'p. 118. 'At the time of the breaking up the foun-' tains of the Abyss, a great part of the materials, which were scooped out of the earth, as well as those which then lay on the furface of the fand and of the 'shore, would be loose, separate and divided, and would float irregularly in that confusion of Elements, which fuch a wonderful operation must have occasioned, not only when showered down in cataracts 'from on high, but also, when conveyed by the force of the waters of the Sea, which gushed forth, as out of a womb to the place destined for their abode; where this heterogeneous mass would subside, and form itself into such Hills and Mountains, of such a ' mixed kind of materials, as we now find them to be, 'according to the wife defignation of the great Author 'of Nature.' Such was the Manner, fuch the Means, according to his Lp. by which Mountains and Hills were produced. From whence it should follow, that Mountains and Hills are no more than huge heaps of Rubbish, thrown out of the Sea, or the place where the fea now is, by the omnipotent Hand of Gop; as his Lp. more clearly afferts, p. 108, and 115: But this referring to the first Cause, when the operation was manifeftly performed by fecond Caufes, is boldly cutting the Gordian knot, which we cannot fairly untie, and shews neither the Philosopher nor the Divine in this case; for both the Word of God, and the whole face of the earth, declare the contrary, as I have already shewed at large, and shall conclude this section with the Testimony of another Author, against this opinion, 'We are to confider that a great many Moun-' tains of the Earth are far distant from any seas, as ' the great in-land Mountains of Asia and of Africk, ' and the Sarmatick Mountains and others in Europe; ' how were these great bodies slung thorough the air ' from their respective seas, whence they are taken, ' to those places were they stand? what appearance is there in common reason or credibility, that these huge masses of earth and stone that stand in the mid-'dle of continents, were dug out of any feas? we 'think it strange, and very deservedly, that a little 'chapel should be transported from Palestine to Italy over land and fea, much more the transportation of 'Mount Atlas or Taurus thorough the air, or of a range of mountains two or three thousand miles long, would furely upon all accounts appear incongruous and incredible: besides, neither the hollow form of · mountains, nor the stony matter whereof they com-' monly confift, agrees with that supposition, that they were pres'd or taken out of the channel of the sea. -- Then too, we are to confider, that the mountains are not barely laid upon the earth, as a tombfrom upon a grave, nor stand as statues do upon a pedestal, as this opinion seems to suppose; but they are one continued substance with the body of the earth, and their roots reach into the abysi; as the rocks by the sea-side go as deep as the bottom of the · fea in one continued mass: and 'tis a ridiculous thing to imagine the earth first a plain surface, then all the mountains set upon it, as hay-cocks in a Field, standing upon their flat bottoms. There is no such common surface, in nature, nor consequently any such super-additions: 'tis all one frame or mass, only broken and disjointed in the parts of it.

2: From the above description of things appears also the absurdity of the opinion, that is at present so much in vogue in France, concerning the origin of Mountains, viz.—That Mountains are only Heaps of Sand and Mud, formed by the agitation of the waters of the fea, which were chiefly put into motion by the flux and reflux of its waves in tides, or fome ftrong currents that met and opposed each other, during the time when the whole furface of the earth was covered with water (for the maintainers of this fystem allow that it has been thus covered). The Sand and Mud having been thus collected and heaped up together, and the water fubfiding and finking to occupy the cavities at the bottom of the fea from whence the fand and mud were excavated, the dryland by this means and mountains were raifed upon the whole furface of the earth.—But furely the Authors of this hypothesis could never have observed the effects of the Agent, which they suppose to have been the Former of mountains, during any violent agitation of the fea, nor have observed the inward Constitution, or outward Form of Mountains. For with regard to the first of these articles, as his Lp. justly remarks (in his Answer to this System of the origin of Mountains, p. 11.) 'The Sea, in its greatest 'agitations, always levels every thing in its power, 'instead of raising it into Hills and Vallies. And if

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^{*} See Messrs. Le Car's, Buffon's, De Mailler's, &c. writings.

these Authors will but make the experiment, of raifing a Mound within the reach of the Tides, and · let but a single Spring-tide get above their works, I believe, instead of finding their Mound increased into 'a Mountain, they will find their Mountain reduced 'into a Mole-hill, if not entirely carried off and ' levelled with the bottom of the Sea.' opposition both to his Lp's. System and that of these Authors, it must be remarked, that the inward structure of Mountains undeniably disproves each of their opinions. For, mountains confift of regular strata or beds, (whether of stone, coal, clay, &c.) orderly posited upon each other, and in an horizontal direction; and besides, each respective stratum is of equal thickness throughout, though they continue for feveral miles in extent;—all which clearly demonstrates that the whole fettled in a regular and fuccessive order, during a quiet and calm sea, or without the least perturbation of the water it subsided in. And fince those parts, that now remain and are visible, of the Mass that thus fettled, viz. the Mountains and their tops, still retain their first and horizontal direction, it is evident that they have not been displaced or their position altered; and also that they have not received any new or fresh Matter to cover them (except the vegetable mould and a few feet of loose stones and sludge; of which hereafter); neither were they formed by occafional or fuccessive additions of Sand and Mud or heaps of Rubbish, for had this been the case, there would have been no regular strata or layers of stone, coal, clay, &c. or if there had been fuch, they would have been inclined on all fides or fhaped according to the outward form of the mountain, and have covered these conical or prismatical Eminences like so many caps or arches laid one upon another; neither could I

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the layers have been of the fame thickness throughout even in a fingle Mountain (much less in hundreds or thousands) but would have been much thicker at bottom than at top; at least those layers that settled last must have been formed thus; for when the Mountain had attained to any confiderable fize, and a new layer or fediment of loofe matter fubfided on it, the far greater quantity would fall down on each fide, and fettle most at and round the bottom, with thin edges towards or near the top; which is a form that, I believe, no mountain upon earth has. But what further shews, that Mountains are not Heaps of Rubbish thrown out of the fea, or quantities of Sand and Mud confusedly coacervated, is, the general uniformity of their shapes, their regularly sloping sides, the manner in which Chains or Ridges of Mountains are continued, being extended length ways upon fuch islands and peninfulas as are longer then they are broad; and fhooting out, like branches from a stock, from high extensive Plains upon the larger Continents of the earth: and then the Gills gradually falling off from the mountain-tops, and meeting the Dales down their sides, the Dales uniting with the Vallies, and the Vallies opening into extensive declining Countries, and these adjoining to the shelving Bed of the Ocean,—all manifestly shew, that the Agent that formed mountains did not act from the Sea upward, or towards the inland countries, and amaffed together large heaps of fand and earth, but descended from the mountain-tops, or the most inland parts of the earth, and furrowed or made its way down towards the very bottom of the Ocean, carrying before it almost every thing that was moveable or opposed its passage.

3. From the above-mentioned uniformity in the shape and course of Mountains, and the apparent

cause thereof; and from the regular manner in which Gills, Dales, and Vallies descend from the mountains and run into each other, gradually declining towards the Sea, it is also evident that Mountains were not owing either to any irregular Elevation or Depression of the strata of the earth: for had either of these been the Caufe, this regularity could never have been preferved and been visible over the whole face of the earth. So that neither Dr. Burnet's, nor Dr. Woodward's and Mr. Wbiston's System of the origin of Mountains is true or confistent with the face of Nature; the first of whom supposes them owing to a sudden depression or finking in of the strata of the earth, and the other two, to as fudden and violent a Depression of some of the strata and Elevation of others; for, upon either of these schemes, the Earth must have exhibited the most ghastly appearances of Rocks and Precipices, and the whole form of it would have refembled the ruins of a desolated edifice, that had been thrown down by a Tempest, or blown up by a subterranean explosion: fo that there would have been no traces of the operation of a Fluid Agent that descended from the mountain-tops and gradually tore its way quite down to the Sea, and fo formed the regularly-floping fides of Mountains, the eafy and natural Cadence and Connexion of Gills with Dales, Dales with Vallies, &c. And

4. This same regularity and uniformity in the risings and fallings of the higher and lower lands, and their mutual dependences on and inclinations with each other, remaining the same at this day in all countries, manifestly shews, that there have been no Mountains or Hills, Dales or Vallies made since the Deluge or the Inundation that caused the present; and therefore that Mountains are not continually a-forming, as some of the modern French philosophers affert; neither were they

occasionally thrown up by earthquakes or subterranean eruptions as some of the old philosophers imagined: indeed earthquakes and such like explosions, instead of raising new mountains, rather tend to throw down the old, by shaking and dislocating the land, where the violence of the concussion prevails, and sinking it beneath the Ocean or into the Abyss; and besides earthquakes generally happen near the sea, and affect not inland eminences or Mountains.

5. NEITHER could the channels of Gills, Dales, and Vallies have proceeded from Contractions or la-

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and Vallies have proceeded from Contractions or lateral shrinking of the strata of the earth (and so the parts of the earth above, or on each side of these cracks, be left eminent or in the form of mountains) in the fame manner and by the fame means as Chaps or Cracks are made in the mud and ouze upon the fea-shore by the heat of the sun-beams and action of the wind, according to the opinion of some of the Ancients. But had this been the case, as the tops of the mountains were dry foonest and most exposed to the influence of these two agents, the Combs and Dales would have been deepest near the summits of hills and mountains, and gradually have lessened or been shallower and shallower as they proceeded down the sides, and terminated in a point at the bottom of mountains; but the direct contrary to this is their form: therefore This could not have been the Cause. Besides; fuch Contractions as these could never have made Eminences, nor would there have been any difference between Mountains and Hills, neither would the inland parts of Continents and large islands have been the highest, as I have plainly shewed they are; for when the mud upon the fea-shore or when the ground in large flat and low marshes is dried and cracked in the fummer-time, the parts or pieces of land between the cracks are equally high, and the whole furface Though indeed thus much may be faid for level. this opinion, that the Cracks and Fissures that were made in the shell of the earth (after it had settled, saturated with water, and the Expanse from above and from below had compressed and hardened, and so contracted the strata in some places, and thereby left gaps and fiffures in others2) gave room for the water that covered the earth during the deluge to descend through into the Abyss; and such as served for this purpole directed, in some measure, or were the cause of the direction of, the courses of the Vallies, Dales and Combs; but they neither did, nor could have formed them for the reasons above given: besides, these Cracks are seldom above eight or ten feet broad (and generally much less) and several vallies are as many miles in breadth, and exceed them as much in length as they do in breadth; and what is more re-

^{*} Or, to give an account of this Effect in the words of a modern writer, 'First then these Fissures are no more, as they seem to me, than the necessary consequences of the first settlement of matter, when it was divided into wet and dry, folid and fluid. " may the more clearly apprehend this, let us recollect what happens to small masses of matter, cloven by like fissures, whence we may infer what is probably the cause of those greater clifts which we are now in fearch of. We all know that slime, diluted clay, and pul-" verized or dissolved stone, shall occupy more space in that state of " moisture than when the same clay, slime, or stone, becomes dry and hard; and, from a parity of reason we may argue, that when solids and fluids formed, and from a state of chaos became divided into, distinct bodies, the parts of the former, being deserted by the latter, · must needs grow closer together, and consequently leave chasms and crevices betwixt them. But the masses of earth, stone, and clay, " were not at this time meerly passive; they formed larger and more compact bodies every where, in proportion to the quantity and mutual attraction of their similar parts, within proper distance. Hence arose firmer combinations, and consequently greater open-

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markable, the Cracks and Veins of ore in many places run directly across the vallies, and yet the vallies continue on in their usual courses; which plainly shews that they were neither formed, nor even altered, by these cracks. But, in short, the sea-shore itself (from whence the above hypothefis is brought) affords a manifest difference between the Cracks made by shrinking and the regularly-increasing Channels of Combs, Dales, and Vallies; for upon the fea-shore or the banks of a large river, especially where there is any quantity or depth of mud and ouze, the chinks caused by the action of the Sun-beams and Wind are nearly throughout of the same fize, meet and intersect each other at almost all angles, chiefly at right, and fo divide the parcels of ground or mud between into squares, pentagons, or some such figure, but never, or fcarcely ever, into long ridges like the chains of mountains. And what is further observable in the fame place, the Channels or Gulleys tore in the

ings between such masses. Farther, it must be observed, that as all fimilar particles struggled to come into contact with each other, fo, 'at the same time, they deserted, and repelled, and expressed all ' diffimilar and contending particles; confequently masses of differently natured particles seceded and fled from each other, every party (if I may use the expression) tending to form and stick close to its like: betwixt such different substances therefore, attracted here, and there repelled, some chink or interval must needs happen. These causes 'then, viz: the defertion of moisture, the union of fimilar and the mutual repulse of disimilar particles, must all have contributed to form the masses of our terraqueous globe into such separate portions 'as we now find them in; for that indeed it was not possible for bodies to grow hard and dry, unite and contract, without leaving fome chasms and fissures between them. What ensued upon the hardening of particular and smaller masses, ensued also in the larger portions of the whole earth, in proportion to the quantity of folids united at any one effort, whether a grain, a fratum, a county, or a region."

and by the retreat of the sea-water in ebbing, or by the descent of land-sloods, do really leave the interjacent land in prominent ridges just like Those of Mountains; and those gulleys or little surrows gradually increase in length, breadth, and depth, as they unite and fall in with each other, just in the same manner as Gills, Dales and Vallies do; which manifestly shews, that both kinds were formed by currents of descending water.

6. Since there are Mountains and Hills, Combs, Dales, and Vallies upon the whole surface of the earth, and these were caused by the retreat of Water from the surface, it is certain, that the Deluge that formed them was universal: And I have already proved that there never was but one universal Flood, which was That

recorded by Moses.

7. SINCE Gills, Dales and Vallies, fall away from the Mountain-tops, and tend in their courses down towards the neighbouring feas, and are united to the shelving Bed of the Ocean, nay, since some of the chains of Mountains are continued under the fea and appear again on the opposite land, or, what is more, fince there are Mountains and Hills, Dales and Vallies, even entirely under the fea, b it is evident, that the water that formed them, descended not only down towards the fea, but even beyond it, into some great Cavity in the infide of the earth; for had it reached no farther than the present surface, or even any confiderable way into the bed, of the Ocean, its waves must have been reverberated or returned upon themfelves, and fo would foon have loft all their force: but fince this force continued and cut and tore the

b Kircher's Mundus Subterrancus p. 69, 96, &c. Marsilli de la Mer. p. 3-12.

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earth under the sea to unfathomable depths, we may justly suppose that the water descended far beyond, entered into, and filled up, a large Concavity within the earth, and so constituted what *Moses* calls the Abyss.

8. Since the Water that scooped out the hollows of Combs, Dales, and Vallies descended into the Abyss, it must of course have carried with it all that quantity of the earth which it tore away for making these hollows; and as it descended from every part of the earth's surface down towards the centre, it would at last reposit and settle the whole there, in form of a central or inner globe or nucleus of terrestrial matter, surrounded on all sides by the water of the Abyss. To which, or to a similar kind of nucleus, moveable in a fluid medium, Dr. Halley ascribes the Cause of the variation of the magnetic needle, and to which not only This, but many other and far greater effects, both in and on the earth, are to be attributed. And

9. When we consider the great length, breadth and depth of the larger Vallies upon the earth, the multitude of the lesser, together with the numerous Combs and Dales that lead into them,—the Height of the Mountains and inland Eminences above the lowland, their distance from the Sea, or rather, from the corresponding Chain of Mountains on the opposite Continent,—the vast Bed of the Ocean, the cavities of all the Lakes, Rivers, &c. I say, when we consider all this, and reslect, that all these Hollows were once filled up, with the solid strata or substance of the earth, from the top of one ridge of Mountains to the opposite, and from that to the next beyond, and so on quite round the globe, (which therefore was once en-

[·] Philof. Tranf. No. 148, 195.

circly spherical, and without any inequalities, or the least rifing and falling, of hill or dale); and that all this fubstance was scooped or hollowed out and carried down into the Abyss, we may suppose the central nucleus to be of some considerable bulk or size. the Agent that did all this, the Water that thus tore and fwept away the folid rocks, and left fuch deep and wide marks of its power, must be great in quantity beyond conception, far exceeding what might be fufficient barely to fill all these Hollows, for it must have passed over and through the folid rocks, where these Hollows are, many times before it could have made fuch gradually worn channels and have opened fuch extenfive breaches; and therefore be far fuperior in quantity to the bulk of the whole Ocean itself and all the water that fills every other Cavity upon the earth; for all these Cavities were made by the repeated actions of this descending Flood. And fince the Tendency of these Hollows and Channels plainly shews, that the Water that tore them descended down towards the Ocean or the feveral Seas upon the earth, and fince the water in them is not sufficient in quantity to have effected all this, there must be (from a consideration alone of the quantity of Water necessary to cause these effects) a large Reservoir or an Abyss of Water beneath the earth; which, during these Transactions, must have been elevated far above all the highest Mountains or Eminences upon the whole furface of the earth; and therefore the Deluge at that time universal, and caused not barely by an effusion of the waters of the Ocean, but principally by those of the Abys, according to the description given by Moses.

II. Another general argument (including, like the former, feveral particular ones, and deduced also from the circumstances of things upon the surface of the earth) in proof of an Universal Flood may be drawn from the confideration of the nature, form, and fituation of feveral bodies or fubstances that at present lie

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1. It is common to observe upon the sides, and even the fummits, of the highest Hills, Mountains, and inland Eminences (especially such as consist of folid strata or hard rock within, and have long flats or any level ground at their tops) a prodigious number of Stones, of various forts and fizes, but generally of one or nearly the fame form; being either perfectly fpherical or oval, or fome way or other tending to a round figure; their furfaces or outfides being quite fmooth, without any projections or angles. observed multitudes of such stones, of all sizes,—from fome that were eight or ten feet in circumference to others that were but two or three inches in circuit, lying upon the tops and fides of fome of the highest hills and eminences in England and Wales; particularly upon the long chain of Mountains that run through the middle of South Wales, and upon the high lands in the northern parts of Worcestershire, Warwickshire, Shropshire, and Staffordshire. And those large stones that lie upon the western side of Shotover hill, near Oxford, and which on account of their Roundness, are called, by Dr. Plot, Lapides testiculares, are of this So also upon Marlborough Downs, in Wiltshire, are an inconceivable number of large stones, which, from their shape and situation, are called the grey Weathers, as refembling a flock of sheep lying down; and

⁴ Nat. Hist of Oxfordshire, p. 129.

many of these, especially such as lie at a distance from the center or middle of these stones, are quite round and fmooth; though vastly large. Mr. Hutchinson fays, that he observed ' many such round smooth stones. of various fizes, from the bigness of a melon to an hundred weight, lying; not only upon the fides, but upon the tops and ridges of the high hills in the · North of England; particularly in Arkendale, and in many other places; and also in Cornwall, and in Devonshire, upon Dartmoor.'e Dr. Lister, in Phil. Trans. No. 164, remarks, 'that all the high mountains and Woolds in the North of England are covered, 'more or less, with a quantity of Sand, mixt with white pebbles of a greater size.' Langius in his Preface to his Historia Lapidum figuratorum Helvetiæ, &c. or, History of the figured Stones in Switzerland, Starts the following question (but leaves it undecided) ' Alfo it has often been inquired, Whether the smooth round stones and flints that are now found upon the tops of the highest mountains, even of the Alps, where no river can possibly pass, were thus smooth and round by nature, or whether they were at first and originally rough and unequal, and then afterwards · smoothed and rounded by currents of water, during the Deluge, and carried to the highest mountains?"

^{*} Vol. XII. of his Works, p. 294.

* Caterum de Silicibus subrotundis & lævibus, &c. It may be proper to remark here, with Dr. Woodward, (see his Cat. of English Fossils, p. 83.) * That the Danish, German, and other writers of Fossils do not restrain the name Silix, to what we in England call Flint, but apply that name to very various bodies; and also that the Romans (as the Doctor proves at large, p. 22.) did the same; understanding by it any very hard Stone that would strike fire, as indeed most hard Stones will. I mention this, because the bodies which we in England call Flints, are sometimes found, and were so formed, naturally of a round shape; and it might be objected to the

Dr. Balthafar Ebrhart in the account he gives of his Journey from Memingen over the Tyrolensian Alps (see Phil. Trans. No. 458, for 1740) makes the following observations 'The mountains of Memingen, which are 'higher than the middle of the highest mountains in these parts, have upon their very summits vast quantities of Stones about three or four inches in circum-' ference, that have been plainly worn round, and just 'after the same manner as those that are thus formed by the stream and attrition of rivers. But it is ma-'nifestly evident that this immensely large heap of 'Stones, which lie, as it were, in a separate and de-' tached manner upon these mountains, where no river 'flows, could never have been formed by currents of Another remarkable circumstance is. 'this kind. ' that these Stones are found to increase in bulk or di-' ameter from Memingen towards the Alps, so as at last to equal masses or trunks three or four feet thick, but from Memingen towards the opposite country and ' more remote from the Alps they proportionably de-'crease less and less, so as at last to be reduced to a 'species of gross fand. This remarkable phænome-' non, which may ferve to explain the theory of the earth, may be accounted for from the following

above quotation that the Flints therein spoken of might have been naturally of a round form, and so not have been worn by any agitation in water. But, first, I would observe that round slints are very few in comparison of the number of others that are found in all kinds of shapes; and Langius himself, in the description he afterwards gives of a Flint or rather of the body he applies the word Silix to (p. 13.) does not mention it as being naturally, or even accidentally, of a round form; and whatever he understands by the word Silix, it is certain that the bodies he speaks of in the above quotation carried in themselves evident marks of having been worn, ground down, and even rounded, by water; otherwise he would never have thought of putting the above question.

observations and reflections. I have observed among the Tyrolensian Alps whole and entire summits of · Mountains, that have in one continued rock the very fame kind of Stone with that which is now found ' in separate and worn parts, and placed at a distance in the country between the Alps and the Danube. 'There are also just as great a variety of these worn flones, as there are of Rocks in the Alps. 'Caufe which broke the Alpine rocks and covered all this part of Germany with fragments torn from thence (and which were afterwards rounded by the mutual 'attrition, between themselves and the waves) could be no other than the great deluge.—The fragments of stone which were torn from the shattered Alps ' (which were as high again as they are at prefent before the deluge) the farther they were carried and the more they were rolled, the more were they worn 'and lessened. Hence the places the nearest the Alps were covered with the largest fragments, those that were more remote, with the smallest. agreement between the most broken pieces of these ftones, and the larger and entire rocks in the Alps demonstrate to the eye the place from whence they came, and that the former are no other than the 'dispersed ruins of the latter.' Swedenborg in his Miscellanea observata, &c. p. 11, speaks of Mountains in Sweden, ' qui lapides babent admodum tritos, & quast politos, & mixtos cum arenis,' i. e. which have stones upon them that are much worn, and as it were polished, ' mixed with Sand.' Bishop Pontoppidan in his History of Norway, p. 56, speaking of the Effects or Consequences of the Deluge, writes thus, 'This [i. e. the Deluge is likewife the origin of most of those Pebbles, which are found scattered in all parts of the 'globe.' And indeed, I think, we may fairly conclude

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from the instances I have brought, that, if all parts of the globe were examined by proper and judicious persons, some such round or smooth Stones as the above-mentioned, lying at greater or less distances, in greater or smaller numbers, would be found upon them.

THE Point therefore to be decided is, How came these Stones to be of this round shape?—Were they originally thus?—Or, formed so afterwards?—And

by what means?

THAT these stones were not originally and at first of their present figure is evident from many particulars, as, 1st, From some of them having on their outlides the bases of hexagonal shoots of spar and chrystal, which are now of a round or circular form at their tops, whereas it is well known that these naturally terminate or end in sharp pointed angles, wherever there is room or space for them to shoot, and such there must have been here, if these stones had always been of the same shape and size: so that as these shoots of spar were once longer, and also pointed at top, and being now round or hemispherical, it is manifest, that they have been worn and ground down to this form by some regular attrition.—2dly,—From several of these Stones having now, lying immerfed in them, and united with their substance, the stiells, teeth, and bones of various animals, pieces of wood, coral, &c. all of which bodies are naturally of some determinate figure, and greatly differing from each other, and yet such parts of these shells, bones, corals, &c. as appear on the outsides of these Stones shall be round or circular or answerable to the outward shape of the stone; and yet the parts which lie immerfed within the stone shall be of the true, usual, and natural form of these bodies; hay, when the stone is broken, there shall frequently

be found in the infide the fame species of shells. corals, &c. quite whole and entire, as those on the outfide, which are now shaped to the figure of the stone; and therefore these on the outside were formerly of the same shape as those in the inside; and of course both Shells, Corals and Stone must have been rounded or brought to this unnatural, fpherical, figure by fome external force or agency. The same is manifest from the Contrast between the manner in which the constituent parts of these Stones originally settled, and their present outward form; it being evident to fight, particularly in the larger ones, and especially in such, as are of a fiffile nature, that they settled in a flat regular manner, or in lines, layer upon layer, each of equal length, breadth, and thickness in all its parts; which could not possibly form a body of a spherical shape; but as these are now of an orbicular form, they must have been reduced and rounded by some outward force.—But, 4thly.—Where these Stones occur, the far greater number of them are generally of the same kind, contain the same species of shells, corals, &c. and apparently settled in strata of the fame fize and order, as the Stone or Rocks in the adjacent Mountains; and so afford an undeniable proof that they are only fragments or pieces torn off from the adjoining mountains; and therefore were not originally of the same size and form as they are now; but have been, fince their separation, much lessened and worn into a round figure. shape and smoothness manifestly shew, that they obtained their form in, and by the motion of, a wet Fluid, such as Water; for had they been subjected to the action of a dry Fluid, fuch as the Air, in a violent wind or tempest, &c. it could not be but that they would have been of the most irregular forms, and their outlides jagged and pointed with angles or em-

boffed with protuberances in every direction; but fince they are so regularly rounded and their surfaces so extremely smooth they must have procured their shapes from being agitated in and by a moult Fluid, fuch as could penetrate and mollify their outward parts, and fo permit them to be worn away, granule after granule, or by a gradual attrition. And when we consider the great size and weight of some of these Stones, their immense number, and the vast extent of ground that in some places they are spread over nay that there is reason to suppose, that they are in some measure scattered over the whole face of the earth) it may fairly be concluded, that there is no moist Fluid, in or upon the earth, in a quantity sufficient for effecting this but Water; which therefore must have been the Medium in which, and the Agent by which, this wonderful phænomenon was transacted. As is moreover evident from the manner in which these Stones lie. Those that are upon the long tops and flats of Mountains or upon high level ground are situated for the most part at a little distance from each other or lie in a separate detached form [not heaped together or in trains]; for as upon such even land, there could be no inclination in the ground to determine them to one place more than another, and as the currents of water, that formed the Combs that descend on all sides of such high land, set different ways, so these Stones, that were shuffled and rolled about upon the top, would be left in the most irregular, loose, detached or stragling manner possible; and accordingly we fo find them. But those that are upon the sides of Hills, especially such are somewhat steep, and particularly at some confiderable distance from the top, lie thick and close, and heaped upon one another: those that are in the Combs, Dales, and Vallies (that fall off from the Mountains) lie still thicker and closer; 0 2

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and chiefly in the bottoms of fuch Cavities, there being few or none upon their steep sides; and also tend in a train from the tops of these Cavities, and gradually increase in number and quantity, as the gills, dales and vallies open and enlarge by receiving other gills, dales and vallies into them; in which lateral gills and dales are also a few, the greater part having been carried down into the large vailles, where they lie in inconceivable numbers; and particularly in the curving parts of the vallies, just before their turnings; or where any rock, that withstood the force of the Flood, or large fragment of a rock, that the waters could carry no further, stands in the middle or any part of a valley. there these round Stones are found in still greater plenty for the depth of many feet under the ground. And what is remarkable, and yet a general rule in this case, is, that such Stones of the above kind as lie near the beginnings of the Combs are least worn, those that lie farther down in the dales more worn, those that lie in the vallies and in the low flat countries most of all worn and perfectly rounded, as having been carried furthest, and agitated most. So that all of them manifestly bear the appearance of having been, not only formed or rounded by water, but also of having been placed just in such manner, as water alone, retreating from the mountain-tops down through the vallies, would naturally dispose them. Many other

[•] It is not uncommon to find among the Stones, that were thus apparently worn round by accident, some, that were always, or naturally of a round shape; and it may be proper to inform the reader how to distinguish between the one and the other; and also to shew how far even these last are serviceable in proving the point in debate. The Stones that are naturally of a round shape, and which are commonly called Nodules, have generally an outward coat or crust, differing from the internal part of the body, either in substance, colour, or hardness; or else consist of several coats; and are usually very hard: those that are of the same substance throughout (as slinty, alabases

circumstances there are (which will readily be perceived by an observer, though they are not so easily to be described to a reader) depending either upon the nature of these Stones, the Constitution of the strata in the adjoining land, or the situation of the ground, &c. that assord occular demonstrations, that these round Stones are only Fragments, which were beaten off from the neighbouring rocks, and worn into their present sigures, by the agitation of Water;—which sluid must therefore once have silled all the deep Vallies, and have covered all the high Hills and Mountains, where these Stones are now found.

nodules, &c commonly are) when broken, split or fall apart in all kinds of directions, those that consist of several coats of different matter, open or separate in pieces, that are convex on the outside and concave in t e infide according to the feveral coats. On the contrary, Stones that are worn to a roundness, which was not natural to them, such as Pebbles found upon the sea shore, and those that are now found upon the highest mountains, have never any coat or investient cruit, break regularly, or according to the grain of the stone, and freq ently into a number of thin flat plates, like the stone that lies in strata in the adjoining hills; and are generally, either foft or hard, according to fuch stone; and carry in themselves evident marks of which I have already recited at large the particulars) that they are pieces or fragments of the adjacent rocks, worn round by being rubbed against one another in such a fluid as Water. And even the Nodules themselves, that are sometimes found among the Pebbles, exhibit manifest proofs of having been broken out of regular strata, carried from their natural and original place, and of having endured the outward force or action of Water. For, first, in such places where we find Nodules of flint, crystal, alabaster, &c. lying loose upon the furface of the earth, it is common to find the very fame kind of Nodules, immersed in their natural beds in the strata of the rocks adjoining, and very distinct and easily separable from the substance of the rock (which is another mark by which Nodules may be known from rounded pieces of the rock): it is therefore reasonable, to believe that the Nodu es, that are now loose, and detached upon the surface of the earth, formerly lay in, and were beaten out of, the adjacent rocks, by the same means or by the same slood of water, that parts of the rocks themselves were broken off and worn round; among which

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But besides this larger fort of round or Bowler Stones, (as they are called in some parts of England; their very form indicating to the most superficial observer that they have been rolled or bowled about) there is another kind of a less size, from some that are two or three inches in circuit to others that are as small as pease, commonly known under the name of Gravel. This consists of a variety of substances, not only of hard, round or smoothed Stones of different kinds, but of parts of Bones, pieces of Shells, Coral, &c. that have been also rounded or worn, how as evidently to demonstrate, that the whole has been in agitation, and that such a

these Nodules now lie. This a'fo is evident from a circumstance attending many of them, viz. that their outward coats have apparently been much rubbed and worn, especially in the more prominent parts, and in some of them quite worn off I have observed too that several of them have had parts or pieces of the rock, from whence they were originally torn, affixed to their outfides, which though at first certainly of no determinate shape, have been, since their separation, regularly rounded to the shape of the Nodules: nay, I have observed large Maffes of the rock, containing feveral Nodules in them, thus worn and rounded; which manifestly shews, that even these Nodules are Fragments, or at least were beaten out, of the rock. Then, lastly, Nodules, being found lying together with, and exactly in the fame manner as, the mountain pebbles and other worn fragments of stone, undeniably proves, that they were posited upon the places, and in the manner, they are now found by the fame means, that the inlandpebbles were, and though they do not shew such strong and clear signs of having endured the force or action of water as the pebbles (chiefly on account of their superior hardness and original roundness); yet they exhibit fufficient marks, as I have described above, of having been subject to its force.

It may not be amiss to observe here, that in some parts of England the inhabitants very improperly call any small, loose, rubble stones, though they are flat, pointed with angles, or of all shapes, provided they lie near the surface of the earth, by the name of Gravel: but unless they are answerable to the above description, and apparently worn or a great part of them worn and rounded, they ought not properly to be, neither indeed are they generally and commonly,

fo called.

fluid as Water was the Agent. Which is further apparent from the manner in which, and the places on which, Gravel lies. It being always posited in a loofe, irregular form, not in a close compact state, or in uniform strata of equal thickness in all parts, as the regular beds of Stone, &c. are; no, this is thrown or pitched, as it were, in streaks or unequal seams, and in all directions, generally in an oblique, fometimes in a wave-like form, just in such manner as the undulating motion of departing Water would naturally Besides, it is usually found free and void of all lighter, earthly, ochreous, clayey or fuch like matter, which, being foluble in water, would, when once assumed up therein, be contained longer, and carried farther than (and fo feldom fubfide together with) the heavier and harder parts of Gravel; which therefore would be left clear and divefted of all fuch lighter matter, and indeed at present it appears to the eye to have been washed and cleanfed by Water. Then too Gravel is commonly found over unmoved and horizontal beds of Stone, Chalk, &c. and being of a nature different from thefe, and lying in a manner different from that in which the strata of the earth originally fettled, it is manifest that This has been moved, agitated, and brought from other places, And fince great part of this mixt substance, Gravel, is of the fame nature with, and confifts of the fame kind of shells, corals, &c. as those which are found in the higher lands or in the grounds above, it is an evident proof that it was brought from these lands. And when we consider the places where Gravel is commonly found, viz. either upon extensive flats just under Mountains or higher ground or in the bottoms of large vallies, or else spread over low-land gently-declining countries, but feldom or never (or but in very fmall quantity) upon the tops or even fides of fharp-0 4

pointed and steep mountains, it affords an additional and undeniable evidence, that it was brought from the upper lands; and being disposed or posited just in fuch manner and just upon those places, where water, retreating from the higher grounds, would naturally throw or leave it, it evidently shews, that Water was not only the Cause of the form or roundness of the various parts of Gravel, but of the Disposition or Settlement of the whole. Such is the form and situation of Gravel in England; and no doubt is to be made but that it is the same or similar in every part of the earth where it is found; and fince there is scarce a country over the whole globe but what has it, more or lefs, fo it is certain that all these countries or the whole face of the earth have been overspread by Water.

UNDER this article may also be reckoned a still lesfer species of round stones than any of the abovementioned, viz. those which constitute what we commonly call Sand; this substance 'being really no other (as Dr. Woodward justly observes, Nat. Hist. p. 188) than very small pebbles; as may appear to any one who shall carefully examine it, especially with a good microscope.' And when thus viewed and magnified; the various bodies of which it confifts as manifestly exhibit marks of having been worn or ground down to their present size and form by the agitation of water, as the parts of Gravel do. too lying in a fimilar irregular manner, and being posited upon such places, as Gravel, equally points out the action of water, retreating from the higher grounds, to have been the Cause of its situation and position.3

In some places indeed what is properly, and ought so to be called, Sandflone, lies in such a loose lax manner, even upon the tops of the highest mountains, (where their upper parts happen to consist of Sandstone) and in some places Sand itself lies thus, as at first fight greatly to resemble the Sand sound in the vallies and in the low cam-

What adds confirmation to this is, that where the up. per land's confift of a lax friable stone, there the Sand lies in the valleys beneath in a greater plenty than usual, or where the country is an extensive low-land plain, and the mountains at a great distance, there also is generally a vast quantity of Sand; as is the case with those immensely large sandy Desarts in the lower or remote parts of Africa, bordering upon the Mediterranean fea; for the water, that formed the Mountains in the in-land or higher part of that great Continent, must have passed over such spacious tracts. of land in its retreat towards the fea, that in all probability it would meet, in many places, with strata of a loofe friable kind of stone, which it would foon feparate, tear asunder, shatter to pieces, and at last grind down to Sand, and when thus reduced, this matter. would be easily carried and hurried away by the torrents of descending waters to a great distance from the mountains, and at last be naturally left expanded over. the low flat countries; or posited in the bottoms of large and deep vallies; and fuch from the maps appears to be the fituation of most of the sandy Defarts And I cannot but think that the upon the earth. far greater quantity of, what is called, Sea-fand, was not formed upon the shores, where it is now found, but was originally Land-sand, and brought down even

paign countries: but there is always a manifest difference between them; for the Sand or Sandstone of Mountains is more coarse than the other, and generally adheres in lumps, and is sound in vast large strata or beds of equal thickness in every part, and regularly divided by horizontal and perpendicular sissures, as the solid unmoved beds of stone, &c. are; whereas the Sand sound in the vallies is small and sine, easily separates when touched, and is alway pitched in unequal streaks, that are commonly thicker in one part than another, and gradually terminate in points towards either end, and is posited in all the variety of directions, that water, slowing over uneven ground, could possibly throw it into.

from the in-land countries. Thus much is certain. that the rains that fall upon the higher grounds generally come down replete with Sand, and deposit it in rivers; and rivers, by washing away their banks, still receive more fand; which being carried down by the currents is at last discharged into the Ocean. And it is very remarkable that upon a fandy shore there is generally a great load or bar of Sand at the mouths of the rivers, the very place where the Sand, brought down by the river, would naturally subside, not only on account of the stream being there broadest and less strong, but chiefly by reason of the opposition the river-water would meet with from the waves of the Sea. which would beat back the current of the river, weaken its force, and oblige it to lay down its burthens. So also with regard to those immense Sand-Banks that are found upon some shores, even where there are no very large rivers immediately adjoining (though they are generally, where there are fuch rivers) it is certainly very reasonable to conclude, that they are in a great measure the product of the diluvian waters; and had the Sea, after the deluge, retreated farther within its bed they would have been left upon the low-lands and now found in the form of fandy Defarts; for as the waters of the deluge retreated from the higher lands, tore out and carried away fuch vast quantities of terrestial matter (as the hollows of the Combs, Dales, and Vallies over the whole furface of the earth abundantly demonstrate) they would naturally deposit a great portion of that mixt substance they were loaded with, especially of the finer and lighter fort, upon those parts or places, where their force first began to abate, or the land was of a proper form for receiving and retaining it, and fuch certainly are those low flat Shores where the principal Sand-banks are found. Some persons indeed have imagined that there is a difn,

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ference between Sea-fand and Land-fand; but the frictest inspection can discover none: And Dr. Woodmard observes, that ' The Sand upon the shores of Sheppey consist of extremely small pebbles of the very fame kind with those commonly found in fand-pits at land, in various parts of England, particularly in ' feveral parts of Kent' (in which County the isle of Sheppey lies): Dr. Lister too remarks (Phil. Trans. No. 164) That the in-land Sand-bills above Bulloigne in Picardy in France is of the very fame kind with that on the ' fea-shore at Calais.' So that, upon the whole, we may as fairly conclude, that the granules of Sand were caused by a friction of the parts among themselves in agitated water, as that the pebbles of which Gravel confifts were; and also that the far greater quantity of the Sand now lying upon the fea-shore was not owing to the agitation of the waters of the Sea, but that the origin of this and of all the Land-fand is to be attributed to the action of other waters: and when we confider the vast extent of the several Sandy Defarts upon the earth, and the largeness of many of the Sand-banks upon the fea-shore, and the distance of these from one another, and how in a measure they are feattered over the whole face of the earth, we must infer that the Cause was as universal as the Effects, and therefore that a flood of Waters has covered the whole surface of the earth.

II. Bur besides these Stones that have been thus apparently rounded by water, there are others that have plainly endured the force of this sluid, though not in so great a degree as the above, either on account of their size, hardness, or the short time they were subject to its force, but yet they manifestly exhibit marks of its power; and their size, number, and situation sufficiently demonstrate that the action of the water,

to which they were subject, was universal or extended over the whole surface of the earth. For

THERE is abundant reason for believing, that there are very few hills or mountains, at least such as confift of folid strata or hard rock within, but what have separate masses of stone, some of an immense bulk. together with smaller pieces, lying upon their tops or fides, and also that there are such stones in the vallies beneath; and both the larger and smaller masses, of all kinds of shapes, and lying in all kinds of postures, though generally in fuch a direction, and fo fituated, as plainly to indicate that a flood of waters, retreating from the higher grounds, was the cause of their position. What Mr. Lbwyd fays of Wales (Pbil. Tranf. No. 334) I have observed to be true, not only in that Country, but in various parts of England: What seemed to me most strange, were vast confused Stones, and, to appearance, Fragments of rocks, standing on the furface of the earth, not only in wide plains, but on the summits also of the highest mountains; To which he subjoins this remark, 'There is no Brimfrom or Pumice-stones on the tops of our mountains, nor any thing else that I suspect to have been the effects of Volcanoes' [fo these stones not to be attributed to fuch causes]. Again; Dr. Stukeley (after having cited the above quotation from Mr. Lbwyd in his Abury restored, &c. p. 17) writes thus: 'So [in the same man-" ner as the above Stones lie the Moor-stones on the wastes and hill tops of Cornwall, Derbysbire, Devon-Shire, Yorkshire, and other places, of a harder nature than these (i. e. the grey weather-stones on the Marlborough downs, of which the Dr. is first speaking] and much the same as the Egyptian Granate.' But the grey weather-stones themselves (of which I have spoken in part before p. 189) are probably as remarkable as any, and as they lie in a part of England, that ded

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is much frequented on account of the great roads, that are near them, principally one that leads from the ferond to the first City of the kingdom, and are well known to most travellers in these parts, I shall give a particular account of them, to fave the trouble of being circumstantial in other relations. These Stones are of a baftard kind of lightest grey marble: and are of various fizes; some of them of 50, 60, or even 70 ton weight; to others fo small as to weigh but They are spread over an irregular space a few pounds. of ground for forty miles in circuit, as I have observed myself; and have been informed, that they extend much farther.1 They begin at, or those that are highest lie upon, the tops of the greatest Eminences on these downs, and tend on each side in incredible Numbers for feveral miles down towards the two nearly opposite Seas, the English Channel and the Briftol Channel, and many of them lie in long trains, just in such a manner and direction, as water retreating from

It is certain that these Stones were formerly far more numerous than they are at present, for many of the Houses and most of the Walls for gardens and enclosures of all the Villages on and near these Downs are built of them; and for several years past full liberty has been given to all, that might want them, to take them away (in order that the ground might be ploughed) and vast numbers have accordingly been taken off.

Then too, the huge Stones of which the two Druidical

Ayloff of Wotton basset hewed one of them to make a rape-mill stone, and employed 20 yoke of oxen to carry it off; yet so great was its weight, that it repeatedly broke all his tackle, and he was forced to leave it. Ld. Pembroke caused several of these stones to be dug under, and found them loose and detached. My Lord computed the general weight of our stones at above 50 ton, and that it required an 100 yoke of oxen to draw one. Dr. Stephen Hales makes the larger kind of them 70 ton. Dr. Stukeley's Stonehenge, p. 6. Some of the largest of these Stones lie in the bottom of a Comb or Valley called Grey-weather-bottom, and are in a great measure covered with coppice wood, which must be removed, and the Stones carefully surveyed on all sides, in order to see their due size.

these ridges would naturally have thrown or placed them, as the courses of the rivers adjoining evidently demonstrate, they tending these two ways; nay, even the rain, that falls perpendicularly upon the earth parts on the tops of feveral of these hills, and retreats towards the two above-mentioned feas; one portion, falling into a branch of the river Avon, descends to Bristol; and another, entering into the river Kennet, (which at fome distance joins with the Thames) goes to London. and empties itself near the East end of the English Channel: but on the South fide of these downs, the rain that falls retreats into another river called the Avon, and runs directly into the very middle of the English Channel: so that these Hills are manifestly the highest land in the South part of England, and from them there lies a gentle declination on each fide towards the nearest seas: which declination (as I have above shewed) was caused by, or was the natural consequence of, a flood of waters that formerly covered

Temples of Abury and Stonehenge (the former fituated on, the other at about the distance of 16 miles from, these Downs) consist, were brought from these Hills and once made a part of the Grey-weathers, as cannot be do bted. when we confider, That there is no stone of the kind of which these Temples are built, nearer than these Downs; may, that there is no stone, that I know of, in all England of the fame kind but those that lie on these downs: which also by being separate and detached from any rock, and lying loose upon the surface of the earth, were most fit for use and ready for carriage: besides; in the Valley where the biggest of these Stones lie are now to be seen several great Holes or Cavities in the ground with slopes on each side, which have been plainly dug, and the chief substance carried away; and in two or three of these Cavities I observed a large grey weatherflone lying, but broken in the middle; and it was very evident, that the earth had been dug away from such Stones, that they might the more easily be carried off; but probably, by some accident (as the machinery not being strong enough), the Stone in raising, fell and split asunder, and then was too small to answer the end designed, and sherefore was left, as not being worth the carriage.

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these lands, and retreated from the in-land parts down towards the fea-coasts; and as the Stones I am speaking of, tend in a course answerable to the effects of fuch a flood, we may justly suppose that their prefent polition and fituation were owing thereunto. Which will be further apparent from a more particular confideration of them. On the tops, and near the ridges of the Hills, there are few, and those separate from each other; but as the distance increases, they increase in number, lying thicker and closer, and chiefly in the bottoms of the Combs; and besides, shape and wind their course according to the direction of the Combs and Vallies; which clearly flews that the Agent that formed the one (the Combs), placed also the other (the Stones): and when we lose fight of them above ground, they are still to be found underneath, lying among broken flints and gravel; and fuch as I discovered here were much less than those that lay upon the furface of the earth and higher up in the Vallies, and also much more worn, and many of them All which evidently denotes, that fairly rounded: water descending from the highest eminences on these Downs was the cause of the position, situation, and direction of these Stones. I have observed too fuch masses of Stone, as the above, lying not only in in-land countries, but also on the Sea-coasts, and many of them so large as to constitute Rocks and small Islands; and that they were really no more than Fragments broken off, and brought down from the mountains or hills above, was fufficiently manifest, not only from the strata in them being in a different polition, and of a different kind from the unmoved strata on the sea-coasts, but that the nearest place, where there were any strata of the same kind with the fragments, was in the mountains or hills above; and from them there lay separate masses of the same kind of stone, some more, some less worn, in the combs, dales, and vallies, quite down to the sea-coasts; where the larger fragments lay, and rested, as it were, upon

the lowest ground.

And what is thus observable in England is to be seen also in other parts of the world. Mr. Innes in his Miscellaneous Letters, &c. (p. 6) speaking of the parish of Magilligan in the County of Londonderry in Ireland, fays thus, 'The Deluge hath left us other marks of its fury, for more than half of our Mountain, is one continued Heap of Stones and Rocks tumbled down, and in particular one Rock left flanding upon the · fide of the precipice: it is about 28 feet in height, about 6 yards about, with natural feams in it, not very well cemented; no art of the Irish could place So also Mr. Smith in his ancient and pre-" it there." fent State of the County of Kerry in that kingdom, p. 82. 4 The most considerable natural curiosities in this [the Southern | part of the Country are two Rocks, on seither fide of the river Roughty, [which in this place is about a mile broad which feem to have exchang'd their fituation: one of them the Country-folks name Clough-Bearradh, i. e. the stone slice. This river divides a lime-stone soil, from one of common grit, a thing very frequent in Ireland, tho' but little noticed, because of its being very common. Except the above-mentioned rocks, all the stone on one side of this river, is lime-stone, and that on the other, is a coarse grit, or common mountain-stone: but opposite to each other, on different sides of the river, a large rock, too heavy for human force to remove; of lime-stone, hath seated itself on the grit-stone side of the stream; and a large rock of grit, hath occupied the place from whence the other feemed to be detached, and is feated among the rocks of limeflone: which is a species of Lulus Naturæ, or sports

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ing of nature, not very incurious; and which must ' have been effected by some prodigious flood, or shock of the earth; but earthquakes have been hitherto; 'till of late, quite unknown to this kingdom.' Bishop Pontoppidan in his History of Norway, p. 56, writes thus, 'Hence [i. e. from the Deluge, as he 'rightly concludes likewife remain on the furface of ' the earth the many detached blocks and fragments, 'like lumps of mortar, scattered not only in the val-' lies and creeks, but also on the tops of the highest ' mountains; many fuch being found here of the bulk of a common house, consequently too ponderous to 'have been raifed to fuch a height by the hands of 'men; and besides, of no visible use.' Again; p. 177, 'The highest crest of the mountain of Svuku in Oesterdalen, a province of Norway, lies, according to a survey taken by the barometer, above two thou-' fand ells higher than the lake of Famund, a water betwixt the mountains. This mount confifts of one 'folid, hard fand-stone; on the top of the mountain flands a folid huge mass of the same stone, which bears on it many marks of a disfolution and difrup-'tion, which can be attributed to nothing but water.' Swedenborg in Acta Literaria Sueciæ (translated in the Literary Memoirs of Germany, Vol. I. p. 66) observes thus, 'That the Ocean once stood high above the Earth feems to be more evidently concluded from 'the face of the Northern parts, than from that of 'countries more Southerly. Here [in Sweden] we ' find entire tracts filled, as it were paved, with Stone's of a huge weight and bulk: and the higher the 'country lies from the fea, these Stones are larger and "more numerous; as in Orebo, which lies high and between two Seas, larger and more numerous 'Fragments are observed than any where else.' Langius in his Preface to his Historia Lapidum, &c. or History of the figured Stones in Switzerland, remarks thus, "Then concerning Stones this truly wonderful occurs, that the tops of rocks and fummits of the highest ' mountains are sometimes divided by joints into separate pieces; and moreover that certain Fragments or large pieces of Stone of some cubits in height and breadth are found lying upon Plains, and even upon · Hills which are at a great distance from higher grounds, or separated from them by vallies: now by what means the aforefaid Divisions or Sepa-' rations were produced in the hardest Rocks, and ' how the above-mentioned Fragments of rocks were brought down to the places where they are now found 'deserves, in my opinion, a diligent inquiry: for I can fcarcely think that they were naturally generated ' in these places, since they carry in themselves evident ' marks of being really the Fragments of Rocks, cum ve-'rissima rupium Fragmenta præ-se-ferant.' A person, who attended Sir Martin Frobisher in his second voyage to the Streights that pass under his name, observed upon the adjoining land, 'Huge and monstrous " mountains, whose great substance were Stones, and these Stones so shaken by some extraordinary means ' that one is separated from another, and discordant ' from all other quarries,' Hakluyt's 3d. Vol. of Voyages, p. 38. Mr. Ellis in his Voyage to Hudson's-Bay, &c. p. 147, speaking of an island (called Marble-island) near the Coast of new North-Wales, fays, 'The tops of the hills are prodigiously rent and shattered, ' numbers of huge Rocks are confusedly huddled to-'gether, as if by an irruption.' Ludolphus, in his History of Ethiopia, p. 28; describing the Mountains and Rocks in Habeffinia, writes thus, 'Amongst these Mountains, and frequently in the Plain itself, ' and in the middle of the fields, rife up Rocks every way steep, yet varying their shape; some looking ' afar off like towers, some like pyramids, some like ' four-square towers built by art, and so even on the ' fides, as if the workman's hand had done it : fo that ' there is no way to get to the top but by the help of ' ladders and ropes.' Under this head may probably be reckoned those two remarkable Rocks or Stones. which front each other, near Blankemburgh in Germany, and which are called Monks Craigs, on account of their resembling at a distance the appearance of two monks in their proper habits, Atlas Geographus, p. 544. So also I may here mention that large and curious Mass or Mountain (as it is called) of Iron-ore at Taberg in Smalandia, in Sweden, for it can really be no other than an enormous Fragment, torn from the mountains above, as is evident from Dr. Ascanius's description of it," which is as follows, 'This Moun-' tain is fituated in a fandy tract of land, of which the ' fand is extremely fine. Opposite to it is a valley, 'through which a fmall river flows. It's perpendi-'cular height is above 400 feet; its circumference half a Swedish league, or three English miles. The whole mountain is one mass of rich iron-ore, and 'even in some parts is mixed with particles of native ' iron.—There are many perpendicular as also horrizontal fiffures all over the mountain, which are filled ' with the fame fand, reduced to a kind of fine mud-' like paste, and in no part whatever is it impregnated with the least particle of the iron-ore of the mountain, but is of the same purity and nature as is found on ' the fea-beaches.-No ore is found beyond the foot of the mountain, nor on the neighbouring plain; fo that it appears as if the mountain had been attificially laid on the fand, for it has no roots, or, like other mountains, its substance does not penetrate the

See Philof. Transactions, Vol. XLIX, p. 30, for the year 1758:

ground.—It is situated near 40 Swedish leagues dif-' tant from the sea.' Another Hill or Eminence that may come under the denomination of a Fragment, is that called the inaccessible or Needle-mountain in Dauphiny in France, as the form and situation of it plainly denote, 'The position of this Hill is such, that it appears to have been inverted or turned upfide down, for it is no more than a thousand paces in circumference at the bottom, and is two thousand at top; from whence it is called the inaccessible Mountain. At the top upon the plain of this hill there is a narrow and · steep Rising or a sharp-pointed Elevation; which ' gave this hill the name of the Needle-mountain (fee 'Histoire de L'Acad. des Sciences; for the year 1700, 'p. 4)' and which, probably was the cause, why it did not fettle upon its larger basis, or the plain at the The famous Rock in Horeb, anciently called Massab or Meribab, and at present the Stone of Moses and the Stone of the Fountains (being that which Moses struck with his rod, in order to give water to the children of Israel in the Wilderness, Exod. xvii) is preserved to this day without the least injury from time or accidents, and is certainly a Fragment from mount Sinai, as appears from Dr. Shaw's description of it, 'It is a Block of Granate marble, about fix yards square, lying tottering as it were and loofe in the middle of the " valley [of Repbidim], and feems to have formerly be-· longed to mount Sinai, which hangs, in a variety of precipices, all over this plain.'n

^{*} Shaw's Travels, p. 352. It may not be unacceptable to the reader, nor altogether foreign to our present purpose, to continue the Dr's description of this Rock, which is as follows, * The waters which gushed out, and the Stream which slowed withal (Psalm, lxxviii, 20) have hollowed across one corner of this rock a Channel about two inches deep, and twenty wide, ap* pearing to be incrustated all over, like the inside of a tea-

Thus I have given instances of large masses of Stone or Rocks lying loose upon the ground in various parts of the earth, and no doubt is to be made but that similar masses are to be found in every part, where there is any considerable extent of land, though such only are taken notice of by travellers as have something remarkable in their appearance. And that these are really no other than Fragments torn off, and carried down, from higher grounds, every circumstance in the above descriptions tends to point out, as the reader will be a sufficient judge for himself from what has been already said on the subject. I shall therefore

kettle, that hath been long in use. Besides several mostly productions, that are still preserved by the dew, we see all over this channel, a great number of Holes, some of them sour or sive inches deep and one or two in diameter, the lively and demonstrative Tokens of their having been formerly so many Fountains. It likewise may be further observed, that Art or Chance could by no means be concerned in the contrivance; for every circumstance points out to us a Miracle, and, in the same manner with the Rent in the Rock of mount Galvary at Jerusalem, never fails to produce a religious surprize in all who see it. Similar to which is Dr. Pococke's Account of this Rock, and also that of the Presetta's of Egypt; each of which the reader may see inserted in the Bishop of Clocher's Translation of a MS. Journal from Grand Cairo to Mount Sinai, &c. p. 34, 24 Edit.

I may here observe too, that in considering this Rock as a Fragment, the Miracle of the water's flowing out of it will appear much greater than if it had been in its natural bed or united to the solid orb of the earth; for it is not uncommon, in breaking up or only boring through the regular strata of the earth, to enter into a natural fissure, which, communicating with the Abyss, is always full of water, and when such is broken into, a stream of water will immediately issue out and continue flowing: but as this Rock was separate and detached from the regular and undisturbed strata, and lying loose upon the surface of the earth, it cannot be supposed to have had any communication with the natural fissures, and therefore the water that proceeded from it, must have been owing to a supernatural Cause; which is agreeable to what an ancient Traveller (M. Baumgarten, a

in this place only enlarge a little on the aforecited paffage of Langius, (p 210) 'That the tops of Rocks and 'fummits of the highest mountains are sometimes 'divided by joints into separate pieces;' for though this may seem a trisling and insignificant observation, yet the opening or widening of these kind of joints was the immediately preceding effect to the tearing off and carrying down of the Fragments, and one was the consequence of the other, as will be evident from the following particulars. These Joints or Openings between the stones in the upper parts of Rocks ought to be distinguished from the natural sissures in the body of the rock, and are distinguishable there-from

German Nobleman, who travelled into Arabia in the year 1507; fee his Travels in Churchill's Collection of Voyages, &c. Vol. I. p. 337) remarks: 'Which Miracle (of the water's flowing out of the above-mentioned Rock) was the more wonderful, because 'this Stone, though it is separated from the rest of the rock, and is almost of a square figure, yet is fixed in the ground by only one pointed corner [see Dr. Shaw's Draught of it, in his 'Travels, p. 350] and consequently not in so sit a posture to extract any moisture from the earth; and therefore its fending forth fuch abundance of water must have been the work of an ' Almighty Hand.' I may here add too, that this Stone was fo small, exposed in such a manner, and situated in such a tottering condition, that it might easily be viewed on all sides, and even turned upfide down, had the people that attended Mofes fuspected any cheat or imposture in this affair; and in order to take off all suspicion of this kind might be one reason why God made choice of fuch a Stone as this for the operation of this miracle, which was fo extraordinary and attended with fuch indubitable proof, that the persons, who had just before murmured and questioned the divine Mission of Moses, now entirely acquiesced in it: and if such persons as Corab, Dathan, Abiram, and their companies (who were ready on every occasion to find fault with Moses and dispute his Authority) were satisfied, surely our present unbelievers (who lay claim to great modesty and reason) ought to be so, since the Miracle was examined by their own fet of people, and they may have ocular demonstration of the truth of it at this day.

by various marks,—being generally far more numerous than the others, commonly filled with fludge or an earth-like matter, but principally are to be known from the others on account of their greater width in proportion to their length, and because their edges or terminations are much worn and rounded, and also the extraneous bodies, fuch as shells, corals, &c. that project from the edges, much worn and rubbed. All which clearly shew that these edges have been fubject to some gradual attrition, and that these joints or openings have been a paffage for fome fuch fluid as Water; which also must have passed through them with fome force or violence, else these edges (which doubtless at first like the ends or terminations of other cracks in stone, were sharp, jagged, or pointed with acute angles) could not have been worn to fuch a degree; which last consideration further shews, that this effect is not to be ascribed to the slow and gentle gleanings of rain through the earth; nor even where the rock is naked and exposed to all the violence and beating of the wind and rain are these openings to be attributed to them (though probably they may enlarge them a little), for they are found almost equal in number, and fize, and have as manifest marks of the force of running water, where the rocks are covered with mould and rubble for the depth of feveral feet, as where the rocks are exposed to the weather. And I believe that there are few or no rocks but what have these joints or openings made by the action of water, in a greater or less degree, even under the turf; which is a proof that this effect was produced before the earth was covered with vegetable mould: and fince these marks of the force of water are to be seen upon the fummits of the highest mountains and rocks throughout the whole world (for we may reafonably suppose that what is common to the rocks and moun-

tains in England and Switzerland, is common also to all other) we must conclude, that the water that opened or enlarged, and passed through these cracks was equally universal with its effects, or spread over the whole furface of the earth; and therefore the Deluge, in which these accidents happened, universal. as the Water made its way through these cracks, it would not only wear and widen them, but by continuing and repeating its action would at last separate and disjoin large pieces of the rock, and remove them from their places: and accordingly it is common to fee, in a country that is exposed and the rocks laid bare, large masses of Stone, some displaced but two or three inches from their original beds, others two or three feet (and there remaining pendulous at the tops of precipices and brows of hills), others carried down the fides of mountains and hills for feveral yards; but none of them removed to such a diftance, or fo much injured in the carriage, but that a judicious person may find the very place they formerly occupied in the natural rock, and have as convincing a proof that they are disjecta membra or the differenced parts of the adjacent rocks, as if he had feen them torn from thence. And if he would judge thus of those that lie upon the tops and sides of mountains, he would certainly determine the fame of those that lie farther down in vallies; for the former, are only the beginning; the latter, the end of the same train: and as the former were pushed down or removed out of their places by the force of descending water, so also we must conclude of the latter; and that both are proofs that a flood of waters formerly covered, and retreated from, the furface of the whole earth.

II. But besides these larger Stones, there are others that are less; which also are to be found loose upon

the furface of the earth, or else but a little way beneath it; and are of such a nature themselves, and lie in fuch a manner, as clearly to point out that they are Fragments torn from the strata above, and placed in the form they now lie, by currents of water descending from the higher grounds. Of these lesser fragments there are a great variety, and no country whatever without them. And as it would be endless to speak of every different species, trace out the accidents that have happened to them, and particularize the arguments deducible from each, I shall therefore treat, only of one species, which, on account of its usefulness in leading to the discoveries of veins of ore, &c. has been accurately fearched into, and carefully examined, by most miners. The species I mean, are those Stones which are commonly called Shoad-An account of which I shall take from Mr. Borlase's Natural History of Cornwall, p. 149; as that Author has illustrated his meaning by some Copperplate cuts, which the reader, if not conversant in the affair, would do well to confult. But first it will be necessary to explain a few terms. A Vein of ore, or a fissure containing ore, is called in Cornwall a Lode or rather Load; and I suppose for this reason, because that is the place where the ore lies, as if it had been loaded up or laded in, as goods are in a ship. The Top-part of the Vein or that which is nearest to the surface of the earth, and which generally confifts of a mixture of ore, loofe stones and rubble, is called the Broil. When this Broil, or rather that which was once the Broil, is found dispersed or lying at any distance from the Load, these dispersed or separated parts are called Shodes or Shoad-stones, because, I suppose, they lie in fuch a manner as manifestly to shew that they were shed abroad or detached from the main Vein or Load; and that this detachment or separation was made by

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the force of water will appear from the following phoenomena, as extracted from the above-mentioned Author.—" First, the Broil is found in greater quantity in the vallies than on the tops or fides of hills; in the level grounds, it is but just moved from its first station, and spread on each side the vein in an equable manner; but if the lode has any declivity near it, then many of the loose stones of the broil are found ftrewed down the hill.—2 dly. The longer the declivity, the farther are these Stones removed; but the shorter and steeper the sides of the hill are, the less distant they are found.——341y. The smaller Stones are carried farthest; on the contrary, the largest stones are nearest to the lode. The smaller are also nearer to the surface of the ground, but the larger ones, deeper, and still deeper as you approach the lode, 'till the last are found contiguous to the lode itself. _____5thly. The farther distant these Stones are from the lode, the fewer they are in number; but they multiply as you come nearer, and are always in greatest plenty next the lode. - 6thly. These Stones are known from all others by their being of a different colour and structure from the shelf, rubble, and other common stones of the ground where they lie, but more particularly by their angles being worn off; and the farther distant they are from the lode, the fmoother they are; and the nearer, the lefs are their angles blunted. In Cornwall we call these dispersed parts of the broil Shodes. ____(Now) From daily observing the grounds they fearch, and the different substances they there meet with, the tinners can readily distinguish between what has been removed, from what has perpetually kept one and the fame station; the karn, that is the firm folid rock, feldom affords us any instances of alteration or movement, but every loofe unconnected part of the earth has been

moved and shifted; and for as much as the transposed bodies are found to be moved more or less, farther or less distant from their former beds, according to their own specific weight, and the declination of the plane they moved on, it is the general persuasion of every intelligent tinner, that this change of fituation can be owing to nothing but the Force of Water, and of no other water so likely as that of the universal deluge, neither are we to think this less the voice of truth, because it is so common an opinion; for indeed the cause speaks so much for itself, that in order to confirm the justness of this reasoning, there remains nothing more to do, than to point out the correspondence and circumstantial agreement betwixt this affigned cause, and each particular effect and property mentioned before.—First then, In low and level grounds the Broil is greater in quantity, and less disturbed, than on the tops or fides of hills, as being but just moved from its first settlement by the vacillating waters of the deluge on a plane furface; whereas on a declivity, and a more exposed situation, the waters had more power to agitate and disperse, and consequently the original covering of the lode is much leffened in quantity. ——2^{dly}. The gravitation of these. flones (usually impregnated with metal) will, when moved with water, make them descend a steep hill quicker than down a more easy descent, in the same proportion as bodies moved on inclined planes, their velocity being in proportion to their own weight, the declivity on which they move, and the impediments they meet with there; but the quicker they descend, the sooner they get at rest, and fix by immerging themfelves in the stiff clay and rubble and vice versa. -3 dly. The smaller Shodes were moved to and fro easily and trequently, and confequently much dispersed; whereas the greater and weightier the shodes were, the more

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they refifted the agitation of the waters, and were less removed. The fmaller Shodes are usually found in and near the furface, being washed downwards, till, by the refiftance of the ground on which they are spread, they are forced out like the rills of brooks into open day, whilft the larger by their fuperiour weight, rest deeper interred, and nearer the lode. _____5 they. The more diftant Shodes are found from the lode, the more they were dispersed by the water, and consequently became fewer in number in any equal space, like diverging rays; and the nearer to the lode, the thicker and more frequent they remain for the fame reason. - 6thly. That the angles of these stones are blunted, proceeds evidently from the agitation of water, and they are smoothed in proportion to the distance they have been rolled; and had the force continued a sufficient while, these Aones would have been as round as the pebbles on the fea-shore; but the farther we find them from the lode, the more trituration they have undergone, and vice ver få."

III. TOGETHER with the above-mentioned Fragments of Stone, both those of the larger as well as those of the smaller kind, both those that are round as well as those of the most irregular shapes, there are also found a variety of other substances, lying in such a manner, both with respect to themselves, and also with regard to the ground they lie upon, as plainly to shew that their situation and direction were owing to the effects of a Flood of Water that once covered, and retreated

from, the furface of the whole earth.

For, first, it is common to observe upon the tops of the highest Mountains a small thin covering of a kind of blackish bituminous earth, commonly known in England by the name of Peat-earth or Turf; and this upon examination appears to be no other than a

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mass of rotten and perished vegetables. And where the mountains happen to have any extensive flats or large spacious Cavities, in form of basons, at or between their tops, there is generally a still greater quantity of these substances, lying in a mostly or morasty kind of ground, with a vast number of trees, of all forts and fizes, buried under them: and many of the trees and vegetables of fuch species are not now known to be growing near these places, nay, some of them of fuch kinds as the nature of the climate will not permit to grow there: p confequently, they must have been brought from other, far more distant, regions: and no Agent or Medium can be thought upon fo proper for effecting this as Water, a Medium upon which these bodies would naturally swim and float, and therefore be easily conveyed from place to place. And the parts they are now found upon plainly shew, that their present situation was owing to a flood of waters that covered the whole furface of the earth; for they are left upon fuch places where fuch a flood, in its retreat to the lower land, would most naturally deposit a great portion of its floating wealth, viz. upon the highest and more eminent parts, or those places which it first receded from; in the same manner as the water upon the fea-shore in retiring, after an high tide, throws, and by the unequally reciprocal or gradually decreasing repercussive motion of its waves, leaves, upon the parts it first recedes from, all lighter bodies or the substances that swam upon its surface; and in a fimilar manner as the fame water in retiring from the channels of rivers, bays, &c. leaves upon the banks and shores the finer parts of the mud and slutch that

" WOODWARD's Nat. Hift. illus. p. 60.

of Northamptonshire, p. 83, &c. HALE'S Husbandry.

it was pregnant with, so when the flood that drowned the whole earth retreated to its appointed place, it left the surface in a manner covered with the finest, lightest. and purest of terrestrial matter, Vegetable Mould .--Secondly; Under the vegetable mould there lies a vaft variety of Substances, of all forts, shapes, and fizes. but each and all of them placed in fuch a direction as manifestly to indicate that their position and situation were the effects of a flood of water retreating from the higher grounds. Thus, for instance, where the higher and more inland countries abound with freestone, and chalk, interlined with layers of slint; in the lower lands you will find for the depth of feveral feet the two former fubstances intimately blended together or washed and worn down to a gritty kind of maum. and the nodules of flint broken into innumerable pieces, and confusedly mixed with the afore-mentioned matter. In fuch places where the upper strata of Mountains confift of Lime-stone, with interjacent layers of clay, and of iron-stone, replete with yellow and red oker, or ruddle; in the vallies beneath you may discover both large and small, round and irregular, fragments of the iron and lime-stone, with unequal and uneven streaks or seams of Clays of all colours, that the above-mentioned fubstances could Where the upper strata confist of tinge them with. a loofe Sand-stone, and a brittle flakey Slate, with beds of clay intervening; in the lower lands you will find for a confiderable depth a gritty marly rubble, filled with immensely small pieces of sharp flakey stone, thrown in a variety of postures. fame may be observed respectively and proportionably of all kinds of strata, in such places. If we descend from the in-land and mountainous countries to the Hills and the Vallies beneath them, and examine the manner in which things lie under the vegetable Mould,

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we shall find them placed much in the same form as those already described, only a greater quantity and a greater variety of them (according to the different species of strata that lay between the Hills and the Mountains) and these also in general much more worn and much smaller, especially those parts that came from the Mountains. If we go farther down, and visit the Low-lands and Marshes near the Sea-shore, a still greater variety and greater quantity of Rubble will present itself to our view; and the fragments of stone much more worn, and in many places, ground down to a fine Sand or Slutch.

Now that this Rubbly-matter was placed in the manner above-described by the action of Water retreating from the highest in-land Eminences down towards the Sea-shore is evident,—from the multitude of Stones that are found in it which have been apparently worn round by agitation of Water; -from the number of fragments of Stone that lie in trains, tending from the higher towards the lower grounds, just in fuch form and direction as water in its retreat would naturally cast them (as I have already shewed with respect to those Stones and Fragments that lie above ground);—from the irregular and unequal freaks and feams into which it is cast; and what is very remarkable that in fuch places where there is any eminent projection in the ground or rock underneath, or large fragments of Stone which the waters could carry no farther, there these streaks and seams of ditterent matter are thrown over it in various concentric arches, and the whole terminated in fuch a form as plainly to indicate that the force of a descending flood placed them thus; -and also from the manner in which this Rubble lies all over the earth; as for instance, upon the highest in-land Eminences, especially fuch as are sharp-pointed and steep, there is but 2

finall portion of this rubble, feldom exceeding a few inches in depth; in the bottoms of the combs that descend from these Eminences, you will find the quantity somewhat increased; in the dales, still more: in the vallies, a much larger portion; and in the lowland marshes near the sea-shore a still greater quantity. for 2 or 300 feet in depth, and in many places even unfathomable. All which would be the natural result of a flood of water, that formerly covered, and retreated from, the furface of the whole earth, and descended into the Sea, or rather, the Abyss beneath the Sea. For, as the in-land parts of the earth were at the greatest distance from those places (the apertures into the Abyss) where the most violent force and strongest action of the water was, so they would be least torn, and of course least covered with Fragments and Rubbish; and the wear and tear by the water would be in proportion greater and greater; and the load of loofe rubble gradually and continually increafed, till it approached the Sea-shore; and by the time that the latter-waters arrived thither, the Ocean would be full or nearly fo, and therefore these waters: would be repelled back again, and the loofe clay, mud, flutch, &c. with which they were filled, be caused to settle upon or near the sea-shore, and so constitute, what we call a Marsh or Moor, being a loose clayey ground, consisting of a variety of terrestrial substances worn extremely small, and placed, in all kinds of direction, as the reciprocal and undulating motion of water would naturally cast them.

Thus I have shewed, from the consideration of that vast variety of bodies or substances that are now found loose upon the surface of the earth (each particular species carrying its particular proof) that this terrestrial globe has been covered by an inundation

of water.

I AM now to deduce some Corollaries from what has been advanced.

1. THEN, from the quantity of matter that is now found loose at the bottoms of Combs, Dales, and Vallies, and from this matter being principally of the fame kind with the strata in the sides of these Cavities. we may reasonably infer that it once made a part of the strata, and so, that the strata were once continued from fide to fide, and of course that the Hollows of Combs, Dales, and Vallies, were once filled up with ftrata fimilar to those, which now appear in their fides or in the bodies of the mountains or hills, in which these superficial Cavities are: and as Mountains and Hills are no more than Eminences caused by the formation of the Hollows of Combs, Dales, and Vallies, fo it is certain that the earth was once of one uniform spherical furface, and that the present irregular, mountainous form, was not the original, but owing to fome after-cause, as I have already endeavoured to

prove, p. 160, &c.

2. FROM that vast quantity of Rubble which in a manner covers the whole furface of the earth, chiefly from that which is posited in Combs, Dales, and Vallies, it is manifest that the Hollows of combs and vallies were not caused by any Contraction or lateral shrinking of the strata (see p. 183) for had these cavities been owing to fuch a cause, there would have been but little or no loofe matter found in them, for in fuch a case the parts of the strata (when the whole earth began to be consolidated after its dissolution) by being contracted within themselves, atom to atom, would be fo closely united together, that the Cavities caused by these Contractions would contain little or no loose matter in them, as is the case with the covered Fissures or those Chasms in the body of the earth, which terminate in themselves and have no Communication with other cracks; in these we never find any such

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toms of dales and vallies: had therefore one fort of these Cavities, as well as the other, been formed by Contractions, there would have been like matter found in each and respectively placed.

3. From the regular and gradually increasing proportion of the rubble that is found in Combs, Dales, and Vallies, it is manifest that these Channels were not caused by any elevation and depression of the strata; for had this been the case, this rubble would have been placed in the most consused and irregular manner possible.

4. From this same increase and apparent tendency of this rubble from combs to dales, from dales to vallies, from vallies to the shelving bed of the ocean, we may determine the place, whither the other part of this rubble (viz. That which formerly filled up all the Hollows and Channels upon the earth and in the sea) was carried to, namely, the Center of the Earth. For had it been carried no farther than the bed of the ocean, and deposited there, it would more than have filled that; because the matter that was tore out for making that Cavity, would equally have filled it when in the form of rubble, as when it remained in whole and unbroken strata: and then there was the additional substance of all that matter, that before filled up the hollows of the Combs, Dales, and Vallies over the whole furface of the earth: and had all this been placed in the bason of the sea, it must more than have filled it. Now fince it is certain that all this rubble was carried down into the bed of the Ocean, and as that did not retain it, it must therefore have passed through, and been carried into some place beyond the bottom of the sea, and that could be no other than the center of the earth, the last place it could be driven to; and there it would remain in form of a nucleus or inner-globe, as described p. 54, 187, and delineated by I in the Copper-plate.

5. Is this load of rubble and fragments of stone were carried down to the center of the earth, it will certainly follow, that the Agent that did this, that the water (as it is of a more subtle and penetrating nature than this matter) accompanied it in its passage and descended together with it; and as this loose matter occupied the center, the water would naturally settle around it, as denoted by G. H. in the PLATE; and

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6. As in tracing the fragments of stone that lie in trains from the mountains, it is common to observe where the descents are gradual (where they are irregular and attended with fudden falls and precipices, great irregularity must naturally be expected) that those stones that are largest and least worn lie nearest the tops, and those that are less and most worn at the greatest distance; and also that these Stones are of the fame kind with the strata in the mountains above, and not of the kind with the strata in the vallies beneath (unless where they both happen to be of the same species) so it is certain that the currents of water which removed these stones from their original beda, and placed them in the manner we now find them, came from the mountain-tops and drove towards the fea, and therefore that these Stones were not thus placed by partial deluges, owing to high tides or accidental inundations of the fea, as some have imagined; for had either of these latter been the cause, the larger stones would have been left nearest the lower grounds, and the leffer necessarily thrown higher up: and if the water of fuch a flood, in its return to the fea, had force enough to bring back any of these bodies, it would naturally leave them in the greatest irregularity, the lesser would be brought to the larger, and the stones of the vallies be mixed with those of the mountains; which is not the case: and therefore these Stones were not thus placed by such partial floods. Q 2

7. From the consideration of some other circum. stances attending these fragments of Stone, especially those that have been worn round by water, we may fee the falfity of another hypothesis, calculated to solve these phænomena, without reference to the universal Deluge in the time of Noah; viz. that these Stones were thus rounded, and the fragments of Rocks torn from their original beds and scattered over the surface of the earth, at the first formation of things, when the earth was totally covered with water, at which time the highest mountains constituted part of the bottom of the fea, therefore it is no wonder, fince the retreat of those waters, that we now find pebbles and rocks in the most inland countries. But the grand question to be folved, is, How came these waters to retire? in which principal particular the Authors of this hypothesis are not agreed, some imagining that the water was rarified and changed into air; others that the Sea by the violent motion of its flux and reflux, threw up vast quantities of fand and mud, and thereby left the fpaces between them as Vallies, which the water occupying, the eminent parts became dry and habitable; with feveral fuch groundless and unphilosophical affertions. But it required, and these Authors suppose it did require, a great length of time, even that of ages, before these transactions were completed, and therefore that the parts of the earth, which at prefent bear marks of the Sea conftituted for a long time the bottom of it, and thereby gave room for the waters to feparate the rocks from their natural places, and form the fragments of stone into pebbles, and place them in the manner we now find them in the most distant countries from the sea. But then there is a very material difference between the in-land pebbles and rocks, and those formed and found at sea. It is common to obferve vast numbers of pebbles and stones upon the sea-Thore which have feveral extraneous bodies, fuch as shells, corals, and corallines, affixed to their outsides, n-

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and many of these so closely adhering that it is almost impossible to disengage one from the other without breaking both; and it is also certain that these grow and are formed at this day, especially in calm and quiet places. But now, after the strictest examination I could make upon immense multitudes of Rocks and rounded stones that I have seen at land, I never could observe any such extraneous bodies adhering to them, nay, not upon fuch as were but a few miles from the fea, when the pebbles upon the fea-shore abounded with them; which must plainly shew, that the places where these pebbles are now found were never the bottom of the fea, nor the pebbles themselves formed at fea, but that they were made at some particular time, or in some general deluge, the waters of which must have been in fuch conftant agitation and perpetual fluctuation, as not to permit such things to settle and grow; which is agreeable to the Mosaic account of the Flood in the time of Noah, fee p. 51. And what further shews that the places where these Stones are now found were never the bottom of the sea, nor the Stones themselves formed at sea, is, that we never find (what is very common to find at fea, and upon the fea-shore) any artificial things, fuch as regularly shaped pieces of wood, stone-instruments, iron-tools, potsherds, &c.

fmall shell or a plant sticking to their outsides; but then these are a very different species of Stones from in-land pebbles (though they resemble them in their outward shape) as I have shewed, p. 196. Nodules were formed during the dissolved state of the earth and the great confusion of things at that time, and many of them have apparently passed through several strata that abounded with shells and plants, and at last settled in strata that were replete with these extraneous bodies, so that it is no wonder that we sometimes sind one or two of these bodies adhering to their outsides: but in-land pebbles were formed at a different time, in a different place, and in a different manner, as may be seen in the above cited page.

naturally lying among them, but only such as were placed there by design or accidentally dropt, as is evident from the prior disturbance of the earth, where such have been taken up at any depth, and their being generally found in such places where Old Cities, Castles, Camps, or Lakes have been. And indeed had these artificial things ever been coval with these fragments of stones, or subject to the agitation of water as they have been, they would certainly have been worn and rounded in the same manner as they are. Besides, the artificial things that are taken up at sea, have indiscriminately shells and corals, growing on them, as well as the stones and pebbles on the shore,

I have read indeed of boats, small barques, anchors of Ships, &c. being found at land in countries far distant from the fea, but then it has generally been in authors of no great credit, and the facts afferted upon no good testimony; but even allowing them to have been true, it is certainly much more reasonable to suppose, that the places where these things were found, were formerly the bottoms of large Lakes, which by defign or accident had been drained, rather than the ancient bed of the Sea; in the same manner as in draining the famous Lake of Martin-meer in Lancashire, which was eighteen miles in circumference, there were found in the flutch at the bottom no less than eight boats, shaped fomewhat like the Canoes made use of in America, as Dr. Leigh in his history of that County, assures us of his own knowledge, p. 18, and 181. Or else these things might be attributed to violent tempests or accidental overflowings of the Sea; and besides, whatever things of this nature may be now found at land in Europe, some allowance must be made for the event recorded (p 82) of this treatife, when numbers of persons procured Ships and other conveniences, under apprehension of a general Deluge, and probably many of these were made at land in countries far distant from the Sea, as it was supposed that the devastation would reach all over Europe: which therefore, as the event did not happen, would be left in the places where they were first made, and in the future ages might be imagined to have been wrecks of thips loft at fea, though the fea never reached these parts; and what parts of the earth the sea has really covered will be best determined by the marks given in the text, in the subsequent pages.

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but the artificial things, even those that bear the marks of the greatest antiquity, which are taken up in the inland countries, have no fuch bodies adhering to them; which is a plain and an undeniable proof. that neither they, nor the places where they are now found, were ever covered by the sea. And here, by the way, we have an eafy and certain method of difcovering what parts of the earth the fea might formerly have encroached upon, and covered for any length of time, and after have retreated there-from, and what not, viz. by observing whether the rocks and stones, especially the artificial things, found at land, have any marine productions adhering to them or not; if they have none, we may depend upon it, the Sea never reached these parts; if they have some, especially if they are of the same kind with the shells and corals upon the nearest sea-shore, we may conclude it has. But upon the strictest researches I could make with regard to these particulars, I could never find that the Sea had receded above a few miles in length, or a few yards in depth, from its original and first known boundaries; and that only in places where the land was low and flat, and these recesses or retreats chiefly owing to banks thrown up, or canals cut, by the art and labour of man. All Hypotheses therefore to account for these in-land rocks and pebbles (which so apparently carry marks of having been moved, shuffled, or worn round by water) upon supposition that the places where they are now found were formerly the bottom of the sea, must fail, and recourse can only be had, for the explication of these phænomena, to the one Universal Deluge in the time of Noab.

1441 (11) de l'agressies James Cale

Line of Araba House Child

o III.

From the confideration of things upon the furface of the earth, let us now descend into the inside, and see what proofs we can educe from thence of an Universal Flood.

And here let us enter the subterranean Kingdom by those easy and convenient passages,—the natural Caves and Holes of the Earth: and in the first place collect what evidence we can for the point in question from

these Caves themselves.

ALL the natural Caverns that I have feen myfelf, or those that I have read descriptions of, appear to me to be no other than what in the North of England are called Swallows, and in the West, Swallet-boles. These Holes or Caves are generally nearly circular at top; and from twenty to two bundred yards or more in circumference. Many of them have a direct perpendicular descent, like the Hollow of a Well, for the depth of feveral fathoms; in others the descent is fomewhat winding and crooked; and generally, at a greater or less distance, there is a large spacious Opening, into which enter feveral leffer Caves or Conduits; fome gently declining from the top, others lying in an horizontal line, and fome descending perpendicularly downright to unfathomable depths. The Entrance or Mouth leading into many of these Caverns is at present horizontal and very small; and hence Naturalists have been greatly puzzled about the vast Spaces within, and how it came to pass that such small orifices should lead to such spacious Openings; whereas in fact the larger Cavities were made first, and the leser that proceed from them after: and the true entrance into fuch Caverns is at top, upon the furface of the earth, and only covered with rubble and mould; and indeed the large Spaces within, in most of these Caverns, reach near to the furface and form part of the true and original entrance; fo that they all may be looked upon as Swallets, or in-land gulphs that fwallowed down the waters of the deluge.

HAVING thus far explained myself, I shall now shew in what various parts of the earth, and how distant from each other, these Caverns are to be found.

THE first that I shall mention, and the most noted in England, is that called Elden-bole, in Derbyshire. This is a direct perpendicular Chafm, of an oblong form, as far as the eye can difcern its depth; the mouth of it is about twenty yards over one way, and eight the Mr. Cotton endeavoured to find the bottom. by plumbing it with a line eight hundred and eighty-four yards long, but could not reach it: and upon examining the lower end of the line, he found that eighty vards of it had funk through Water. Another gentleman let down a line nine bundred and thirty-three yards, without meeting with the bottom. The Earl of Leicester, in Queen Elizabeth's days, caused a man to be let down with a basket of stones tied to his middle, in order that by letting some of them occasionally fall, he might judge of the depth of the Cave, and after he had remained at the length of a rope of two bundred ells for some time, was pulled up, in expectation of some great discoveries: but when he came up, he was senseless, and died of a phrensy in eight days." When I was upon the fpot, I found, upon enquiry, that two men had lately ventured down this cavity, upon fupposition, that some cattle, that had been missing, might have fallen into it: and when they had descended to the depth of seventy yards, they found the carcases of several oxen and sheep; but could get no further; these carcases, together with the stones that had been thrown in by the curious in endeavouring to

[.] See the Wonders of the Peake, p. 40.

[·] Philof. Trans. No. 2.

[&]quot; Hobbes de Mirabilibus Pecci.

discover its depth, having probably covered and stopped up the leading Cavity. They faid also, that after they had been let down about half way, the cavern opens and widens into a spacious vault, and that there appeared to be another great cavity, besides that of Elden-hole, leading to the furface of the earth. upon examination, I observed, that, at about the diftance of two bundred yards from Elden-bole, there was a gradual, nearly circular, Sinking in the earth, near three bundred yards in circumference, and from its utmost summit, about twenty yards deep: and this appeared to me to be undeniably the true mouth of this Swallow, and that Elden-hole is no more than a lateral conduit leading into it. Three miles Northward of Elden is another famous Cavity, called Peak-bole, situated almost in the Village of Castleton, and at the foot of a femi-circular, or rather femi-cylindrical Rock, (the hollow fide facing you as you enter) above two bundred feet high, and the diameter of the cylinder about fixty feet; at the bottom of this perpendicularly hollowed rock, this Cavern opens its mouth in form of an arch at least forty feet high, and fixty broad at the bottom;" the top part, and the fides of this arch, as also the whole semi-cylindrical rock above, are very smooth, and apparently worn away by the gradual attrition of some such Agent as water; and had not one fide of this tubular Hollow been broken down and carried away by the Agent that first formed this perpendicular Channei, it had resembled at the top and in the infide a common well, and at first fight would have been esteemed a Swallet-hole; and the not attending to this particular, has caused great perplexity in accounting for the origin of this Cave. From the

w If the reader has not seen the place, he may have a just idea of it from No. 8. of Mr. Smith's Prints of the prospects in the Mountainous parts of Derbysbire, &c.

mouth of this Hole to the distance of one bundred yards the roof gradually declines, till you are obliged to bend and creep in order to proceed forward, and after you have crept a little way, you enter into a spacious wide apartment; which continues for about thirty yards, when the rock almost closes again, and after you have passed (in a little boat) a river that runs through the Cave, the rock widens again into a still greater Opening, till you come to a fecond stream of water, where it again contracts itself; but as foon as you have passed this Current, another spacious Opening presents itself, which continues in some places higher, in others wider, till the roof of the rock lies upon the very furface of a third Current of water, and puts an end to the traveller's journey; but by agitating this water with our feet, we heard a rumbling undulating noise in some great cavern beyond. From the entrance to the end of this Cave is about seven bundred Where the larger Openings were, there were yards. feveral leffer lateral Cavities or rather Conduits, and fome that descended perpendicularly down from the top, and the fides of all, both large and small, are worn as smooth and as round or rather tubular as a constant passage of water could possibly wear them: and as this Agent would exert itself stronger and make more. room for itself where the greater number of streams met, hence it is that where the Conduits for the water appear to be larger and more numerous, there the Openings within are wider and more spacious; and where there appear to have been but one or two paffages for the water, and those small, there the Cavities are proportionably less. Not that I would suppose that the water tore these passages through the solid rock without any prior opening or fiflure: no; there were proper cracks and chasms made for its defcent before, as I have shewed, p. 50, 184. But where

these cracks were larger than in other places, there the water would descend in a fuller body and with greater imperuofity, and would work and wind its way through leffer cracks to get into the greater Cavities, and by its frequent passages through both forts of these Channels, would wear and tear away the rock to a great degree, and fo vaftly widen the original openings. And as these original Cracks would naturally be irregular, according to the grain or different constitution of the stone or strata in which they were formed, fo these irregularities, when opened and widened by the paffage of the water, would produce the rifings and fallings in this and fuch-like Caverns. been longer in describing and accounting for the origin of this Cave, than I need be with respect to any other, for though there are scarcely two that are exactly alike in every thing, yet there are none, that I have feen, but what agree in the chief and principal particulars. Thus, at about the distance of eight miles South-West from Peak-hole there is another fimilar Cavity known by the name of Poole's-bole (not far from the village of Buxton) about fix bundred yards in length. In this also there are several risings and fallings, feveral leffer and larger Openings, with collateral conduits, and the fides of the rock in all much worn, and in many places greatly torn, as appears from the large fragments that lie loofe at the bottom. The three above described Caverns are indeed justly esteemed the principal in this County, but there are many that are less, and equally demonstrative of the opinion I have advanced; and there are still a greater number that are, in a manner, undiscovered; for though they cannot be entered and examined, yet these entrances or orifices are very visible, and are eafily diftinguishable from the mouths of the pits from whence they dig ore, for these latter have generally a

heap of rubbish thrown out all around them, and defcend perpendicularly downright, whereas the Swalletboles have no fuch matter round them, but the rubbish lies in the bottom, and there is commonly a gradual inclination or feeming finking in of the earth that leads to them. It is not unufual for miners in tracing veins of ore to open some of these concealed Cavities, and when they do fo, they generally find as large Caverns within them as either of the above described. This Country indeed abounds with these covered Swallows (as they are called) especially upon the moor-lands, and I have feen some of the extensive flats there so perforated with them, that the face of the earth resembled, (comparatively speaking) a Sieve. I have also seen feveral such upon the Mountains in Wales, especially upon those above Tenby in Pembrokesbire, and vast numbers of them upon Mendip-bills in Somersetsbire, particularly in Charterhouse-liberty and near Green-ore Farm; and Ookey-hole, which is about four miles diftant from the last mentioned place (of which and of fome other Caverns near it, there is a particular account in Philos. Trans. No. 2) is evidently no other than a Swallet itself; as also are the Caves lately discovered at Lockston and Banwell, about twelve miles to the North West of Ookey; all these being in every material circumftance exactly fimilar to those I have already de-There are also a few of these Swallet-boles scribed. in and near St. Vincent's Rocks, about two miles diftant from Bristol; and Penpark-bole (of which the reader may fee a description, and a cut representing the infide of it, in No. 143, of Philof. Trans.) which is about four miles Northward from the aforesaid Rocks, is manifestly no other. Of the same kind is the Cavern mentioned by Sir Robert Atkyns, in his ancient and present State of Gloucestersbire, p. 230, to have been discovered at Cold-Ashton, ten miles to the East of Penpark (which upon enquiry, I found has been fince

stopped up); the description of which is so natural that it is worth reciting, 'As a person was plowing with oxen, one of the oxen faltered in a hole, which, when the earth was removed from it, appeared like to the Tun of a Chimney; through which feveral persons have been let down; where they found a · Cavity, in which one might walk above half a mile one way, and it is not known how far the other: and as they walked with candles, they observed feveral such Tunnels ascending towards the surface of An ingenious gentleman, in giving " the earth." an account of his Journey over Cross-fell Mountain in Cumberland (which is part of that immense ridge of mountains that reach from Derbysbire to Scotland, and are called the British Alps) writes thus: . The Swal-· lows, those incontestable remains of Noah's Deluge, begin here [on Roderic heights] to be very frequent. · Some of these are thirty or forty yards in diameter, and near as much deep, perfectly circular, but contain no water at any feafon, the ground having gradually fallen in at the finking of the waters; but where they happened amid rocks, the holes are left open to incredible depths.' The fame Author fays, 'That on the top of the same [Roderic] heights, is a pretty large Lake, called Greencastle-lock, which receives no visible feeder, but emits a small stream Northward to the faid burn;'x and this in all probability is no other than the mouth of a large Swallet. Another gentleman gives the following description of Ingleborough Mountain in the West-riding of Yorkfbire; which as it contains not only an account of

* Gent. Mag. for August, 1747.

Gent. Mag. for March, 1761. This Mountain is reckoned to be one of the highest in England, according to an old saying in the North,

Pendle-bill, Penigent and Ingleborough
Are the highest Hills all England thorough.

Swallet-holes, but also some other particulars relative to the subject I have been treating of, I shall insert it at large. 'This mountain is fingularly eminent, whether 'you regard its height, or the immense base upon which it stands. It is near twenty miles in circumference. In this mountain rife considerable freams. which at length fall into the Irifh Sea. The land ' round the bottom is fine fruitful pasture, interspersed with many acres of lime-stone rocks. As you ascend the mountain, the land is more barren, and under the ' furface is peat-moss, in many places two or three yards ' deep, which the country people cut up, and dry for burning, instead of coal. As the mountain rifes, it becomes more rugged and perpendicular, and is at 'length fo fleep that it cannot be ascended without great difficulty, and in some places not at all. In ' many parts there are fine quarries of flate, which the e neighbouring inhabitants use to cover their houses; ' there are also many loose stones, but no lime-stones; 'yet, near the base, no stones but lime-stones are to be found. The loofe stones near the summit the 'people call greet-stone. The foot of the mountain abounds with fine springs on every fide, and on the west-side there is a very remarkable spring near the ' fummit. The top is very level, but fo dry and barren that it affords little grafs, the rock being but barely covered with earth. It is faid to be about a ' mile in circumference. There are likewise discoverable a great many other mountains in Westmoreland and Cumberland, as also the town of Lancaster, from which it is distant about twenty miles. The west and onorth sides are most steep and rocky; there is one part to the fouth, where you may afcend on horseback; but whether the work of nature, or of art, I cannot fay. A part of the said mountain juts out to the north-east near a mile, but somewhat below the fummit; this part is called Park-fell; another part iguts out in the fame manner, near a mile, towards the east, and is called Simon-fell; there is likewise another part towards the fouth, called Little Ingleborough; the fummits of all which are much lower than the top of the mountain itself. Near the base. there are holes or chasms, called Swllows, supposed to be the remains of Noab's deluge; they are among the lime-stone rocks, and are open to an incredible depth. The fprings towards the east all come together, and fall into one of these swallows, or holes, called Allan Pott; and after passing under the earth about a mile, they burst out again, and slow into the river Ribble, whose head, or spring, is but a · little further up the valley. The depth of this swal-· low, or hole, could never be ascertained; it is about twenty poles in circumference, not perfectly circular, but rather oval. In wet foggy weather, it fends out a smoak, or mist, which may be seen a considerable distance. Not far from this hole, e nearly north, is another hole, which may be eafily descended. In some places the roof is four or five yards high, and its width is the same; in other places not above a yard; and was it not for the run of water, it is not to be known how far you might walk, by the help of a candle, or other light. There is likewise another hole, or chasm, a little west from the other two, which cannot be descended without difficulty: you are no fooner entered than you have a fubterraneous paffage, fometimes wide and ' spacious, sometimes so narrow you are obliged to ' make use of both hands, as well as feet, to crawl a confiderable way; and as I was informed, fome perfons have gone feveral hundred yards, and might · have gone much further, durst they have ventured. There are a great many more holes, or caverns, well worth the notice of a traveller: fome dry, fome having a continual run of water; fuch as Blackfide Cove. · Sir William's Cove, Atkinson's Chamber, &c. all whose curiofities are more than I can describe. There is' · likewise, partly south-east, a small rivulet, which falls into a place confiderably deep, called Long-Kin; there is likewise another swallow, or hole, called . Gobnson's Jacket-bole, a place resembling a funnel in shape, but vaftly deep; a stone being thrown into it, makes a rumbling noise, and may be heard a considerable time; there is also another, called Gaper-Gill, into which a good many springs fall in one ftream, and after a fubterraneous passage of upwards of a mile, break out again, and wind through, Clap-' ham; then, after a winding course of several miles, this stream joins the river Lon, or Lune; and, passing by the town of Lancaster, it falls into the Irish ' Sea: there are likewise, both on the west and north ' sides, a great many springs, which all fall into such cavities, and bursting out again, towards the base of the faid mountain, tall likewife into the Irish Sea, by the town of Lancaster; and what seemed very re-' markable to me, there was not one rivulet running from the base of the mountain, that had not a consi-' derable subterraneous passage. All the springs arose 'towards the fummit, amongst the greet-stones and ' funk or fell into some hole, as soon as they descended to the lime-stone rocks; where passing under ground ' for fome way, they burst out again towards the base. 'There is likewise, to the west and north, a great 'many fwallows or holes, fome vaftly deep and 'frightful, others more shallow, all astonishing, with 'a long range of the most beautiful rocks that ever adorned a prospect, rising in a manner perpendicular up to an immense height.'

BEFORE I proceed to shew, that these Swallet-holes are to be found in other parts of the world than England, it may be proper to subjoin some other particulars (which could not well be reduced under the foregoing heads, without breaking the narrative too much) which will serve further to prove, that these Cavities

were formed by the passage of water.

1. Then it is common to observe in Caverns of this kind where the Rock contains any extraneous fossils, fuch as shells, corals, bones, &c. that these extraneous substances are all worn smooth and shaped to the form of the rock. Now it is certain that these bodies have naturally a determinate figure, each different from the other, and all diverse from what we can suppose the inside of a rock to be; and when we fee, that parts only of these bodies remain in the rock, here an half, there a quarter, and in another place a third part, and these remaining portions, not of their natural figures, but shaped and curved according to the concavity of the rock, it is manifest that some external force hath carried away the deficient parts; and when we consider the regular smoothness of the rock, and the gradual wear or attrition that these bodies have apparently undergone, we can attribute this work to no other agent than Water; and though in these caverns there are generally drainings and droppings of this fluid, yet the motion of it in this case is so slow and the quantity so small, that the above-mentioned effects can never be ascribed to it; nay, I have observed the above-mentioned phænomena in covered Swallets, and even near the mouths of them, when the mouths themselves had been covered for the depth of several feet with rubble, and yet none of the rubble in the infide of the Swallet-boles, fo that the wear and tear of these extraneous bodies could never have

been owing to the fluggish motion of the drainings of water from the furface of the earth. And befides. thefe bodies themselves exhibit full proof, that the water passed through the concavities in which they are, with vast violence and impetuosity; for, it is common to observe in the natural and unworn fiffures of the earth (where the rock happens to contain extraneous bodies) part of a shell or of a branch of Coral sticking in the rock on one fide of a fiffure, and the other part of the fame Shell or Coral on the opposite side, so that it is plain that no force has been here used besides that which made the original crack: but on the contrary in Swallet-boles I have often feen part of a large shell or the stem of a spreading branch of Coral on one side of the Cavity and no appearance of any fimilar fubstance on the other; fo that it is undeniable, that the original fiffure has been torn, widened, and the rock carried away, the whole face of the Cavity pointing out, that Water was the Agent, which therefore must have passed through with great force and violence. ther proof that these Caverns were formed by water, or, that rapid currents of that fluid has passed through them, may be drawn from the multitude of in-land pebbles that are to be found in most of them. these pebbles obtained their shape by being agitated in water, and that wherever they are now naturally found, water has been, I have already shewed at large (p. 193) and that this water passed through the Caverns in a full body, and brought down with it vast quantities of these pebbles, is evident from hence, that they are not only to be found at the bottoms or in the lower parts of these Caves, but even high up in the nitches and covered cavities in the fides, and many of these pebbles consist of a different kind of stone from that of the rock of the cavern, fo that they must have came from far, and the streams that brought them been rapid and ftrong. Another material circumstance evincing that these Swallows were made by water, is, that where great numbers of them occur together, reaching over perhaps an extent of land of some miles in circumference, there the land is nearly level and flat, without any of the Divisions or breaks in the earth caused by Combs and Dales; and the reason is plain, for the water that would otherwise have torn the ground into gills and dales, passed off through these Swallet-holes, and so tore inward and subterranean Cavities, instead of outward and superficial Hollows. This, I fay, is the case where vast numbers of these holes happen to be near each other, but where there are few, not more than three or four, and those very large, and so close together as to make but one, and no Swallows near them for the space of several miles, there I have observed two or three small Combs, running in different, almost opposite direction, and meeting in the mouth of the Swallet as in a center. And the reason of this is equally clear for the point in question. For there being here a natural drain for the waters, and that a very large one, and no other similar cavity near it, not only the waters that were immediately over this hole, but even those that were at a distance, would rush towards it and in their access wear and tear the ground into gulleys and combs, and leave the present standing marks of its course and agency. And wherever we see three or four Combs terminating, from opposite sides, in a point, and a deep finking in the earth in the center, we may depend upon it there was a Swallet-hole; and this I have frequently observed to have been the case in a low wet marshy bottom, or where there has been a small lake or natural pond. And from the description that I have already given of Lakes (p. 143, &c.) we may conclude that most, if not all of them, were originally Swallet-holes, and also that the Cavities of the Whirlpools, Under-currents, and Gulphs, treated of (p. 136, &c.) were the same, and therefore that these holes are to be found all over the sace of the earth, and of course the water that passed through them

must have been equally extensive.

Bur besides what I have already said, to shew the extensiveness of these effects, I may also add some other accounts from different countries. Mr. Smith in his ancient and present state of the County of Kerry in Ireland (p. 122) speaks of a large and deep Hole; 'filled with water, called the Devil's punch-bowl, on the West-side of the mountains called the Reeks; which certainly can be no other than a Swallow; and the caves mentioned (p. 167) are of the same sort; 4 All ' the lands about Killeene are good lime-stone grounds, ' having, in fome places, considerable Caverns; a thing 'not uncommon in such kinds of Soil:' which last observation is so true that I scarce ever saw a lime-stone country but what abounded with Swallet-holes. France, at a place called Roufignac, about five Leagues from Perigueux, is a famous Cavern called Grandville's Hole, which has feveral deep cavities, collateral conduits, and circular boles in the vaulted roof, rifing like regular cupolas, fimilar to those in Obkey and in the Penkboles." Bishop Pontoppidan; in his history of Norway (p. 47) describes a rock or mountain, 'that has an aperture in it passable throughout, one bundred and 'fifty ells in height, and three bundred in length;' and (p. 49, 50) he mentions other Caves, 'in some of which he observed smooth beds of little stones or a 'gravelly bottom.' Dr. Bebrens in his natural History of Hartz-forest, in Germany, gives a full and particular

² Gent. Mag. for 1748, p. 581, translated from the French.
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account of a great number of Caverns that are to be found there; and from the description it appears, that there is fuch a similarity between them and those found in England, that no doubt can be made that they were all owing to the same origin, or formed by the same In the Philof. Trans. (No. 109, and No. 191) there is a long account of a little Sea or rather a large Lake, called the Zirebnitzer-Sea in Carniola, in the South-East part of Germany; the water of which retires under-ground through feveral great holes at the bottom of it, once every year, and then these holes are visible, 'which are in the shape of basons or cauldrons, the breadth of them being from twenty to fixty cubits more or less; and the depth from eight to "twenty cubits; and in the bottom of them are several 'lesser holes.' 'And besides these there are also diverse Caverns and deep places in this Country, even where there is no water; particularly in the mountain called Javorrick, near this lake, there are two · Holes or exceeding deep precipices, in which many 'thousand wild pigeons rooft all the winter; and on the top of this Hill is a Hole of an unknown depth, out of which there often proceed noxious steams: and on another mountain are two great and terrible flony caves, which though far distant from each other, have yet the same effect, viz. when it thunders and lightens, do emit water with an incredible force. Near this Lake is the natural Grotto Podpetschio, with feveral channels in it, running diverse ways, and all the channels are formed in a very hard rock, and are smooth or polished as if cut by men's ' hands.' And the Author shews from several phoenomena, that the Country is cavernous for feveral miles in extent, and though water passes through some of these caverns at present, yet it does not through all,

though all have marks of its force. The famous Grotto, in one of the Islands of the Archipelago, called Anti-paros, which is reputed to be nine bundred yards deep, and has feveral collateral Cavities and profound Abysses in it, is certainly a great Swallet, as is abundantly evident from the description, given at large of it, by Monf. Tournefort in his Voyage into the Levant, Vol. I. p. 146, &c. Scheuchzer in his Itinera Alpina, Vol. I. p. 281, speaking of a Lake upon one of the mountains of the Alps, writes thus, 'Circà bunc Lacum, &c. You may see, on every side, around this Lake, certain winding traces or furrows worn in the hard rock, which perhaps were owing to the waters of the deluge.' Kircher in his Mundus subterraneus* gives particular accounts of feveral Caverns (too long to be inferted here) and shews from a variety of Authors, that such like Cavities are to be found in all parts of the world, both in Europe; Afia, Africa, and America; and as no doubt is to be made that fimilar effects were owing to fimilar causes, so we may fafely conclude, that the Caverns in other parts of the earth were formed by the same means and are of the same kind with those in England; and as I have already shewed, that those in England were owing to, or at least have been torn and widened by, the passage of strong currents of water, so we must determine of the rest; and of course that the water was as extensive as its force, i. e. extended all over the earth, and therefore that there has been an Universal Deluge.

I shall now subjoin a corollary, or an observation or two, to what has been above discussed, by way of general proof of some of the particulars already

advanced.

^{*} Lib. 11: Cap. XX;

Vallies, and the final union of all these in one large furrow, even under the Sea, shewed, that the water that excavated these hollows, descended into some great cavity in the inside of the earth, even beyond the bed of the Ocean, and there formed an Abyss; so the collateral Conduits of the Swallet-holes, leading down into one great unsathomable Cavity in the bowels of the earth, prove, that the Water that formed them, descended likewise even through the shell of the earth, and there constituted a part of the

above-mentioned subterranean Reservoir.

2. It is not uncommon to find Swallets that have fmall rivers running into them, and which have no known exit; and when miners are digging very deep in the earth, they fometimes break fideways into a Swallet-hole, and when they do fo, they advantageously turn all the water of the mine into it, and moreover throw in all the rubbish they dig out, and yet can discover no bottom. And if those Lakes mentioned p. 143, which receive one or more large rivers into them, are also Swallets (as I have above-shewed they in all probability are) then this also is a proof that there is a subterranean reservoir of water. any one should imagine from this particular, that therefore Swallets in general might have been formed by river-water, let it be remembered that they are commonly found upon the tops of the kighest Mountains especially such as have extensive flats, where neither river nor rain-water could have any force to tear fuch Cavities, and therefore they could not owe their origin to fuch a Cause. In those places indeed where these holes lie at the bottoms of mountains, such ri-

[•] See Page 186, &c.

vers as take their rise near the tops, would naturally flow into them; and where the Swallet-holes are fuperficial, or even run for a considerable way under the Earth, but not deep into it, would flow out again; in the same manner as the rivers run down the bottoms of Combs and Dales, or any natural declivity or hollow; but as these latter were not formed by river-water, so neither were the former.

3. As Swallet-holes are extended all over the earth, and the water that formed them descended downwards from every side towards the center and passed through the shell of the earth, it would naturally reposit at the center all the matter that it tore out in excavating these Hollows, which would there constitute

a nucleus or inner-globe.

4. AFTER the strictest search and examination I could make, either from books or observation, I could never learn that there had ever been any natural feashell, coral, or coralline discovered in any of the caverns at land in the manner they are frequently found in the caves and cavities in the rocks on the fea-shore. the fides of which are usually lined, and the smaller cracks and crevices filled, with them; but no fuch being to be discovered in the Caverns and Swalletholes at land, we may fafely conclude, that the parts of the earth where these in land Cavities are, were never the bottom of the Sea or for any confiderable time covered with the Ocean, and therefore that the hypothesis, (lately renewed and resitted by some French philosophers, and favoured by several English) is false, which attributes the manifest appearances of this Globe's having been covered by water, to the primæval inundation of the Sea, by which it is supposed that at the first settlement of things, the water would naturally cover the whole furface of the globe, and constitute a Sea over every part; but after a long time (by some means or other) it receded and permitted the Sea to retire into the lower and hollow parts of the earth; and to this original inundation or disposition of things are to be attributed all the marks of an inundation on the furface and in the infide of the earth; but had this been the case, these in-land Caves would have been filled with the spoils of the Ocean, and we should see Shells, Corals and Corallines, in their natural state, sticking on to the sides and filling the crevices of the rocks; whereas all the shells and corals that ever I discovered in these caverns were in an extraneous state, either filled with stone or immersed in the folid body of the rock, which could never have been their natural state; and therefore they could never have been placed in this manner according to the common laws of nature.

5. And from the same arguing and circumstances of things we may have undeniable marks how far the Sea, in any place for any considerable time, has covered the land; for if in the holes and caves of the earth, in any such supposed place, there be found shells and corals in their natural state, especially if they be of the kinds with those usually growing in the nearest adjoining Sea, we may then justly suppose, that the Sea has covered these parts; but if no such shells or corals be discovered in these caverns, then we may depend upon it, that the Sea has never reached these parts, or covered them in the manner it now covers and overslows its usual and well known bed; or the Sea-shore.

IV.

Another general and comprehensive Proof of an Universal Decuge may be drawn from the numerous and various spoils of sea and land animals and vegetables that are now found in every part of the earth.

'HERE then [to make use of the words of a learned and ingenious Author we appeal once more to Nature; and find that, in fact, there are, at this day, ' as evident, as demonstrative, as incontestable proofs of the deluge, over the face of the whole Earth, at the distance of about four thousand years, as if it had happen'd but last year. And whereas Moses assures us, that the waters prevail'd fifteen cubits above the tops of the bigbest mountains, let the mountains them. 'selves be appealed to for the truth of this affertion: examine the highest eminences of the earth, and they all, with one accord, produce the spoils of the ocean deposited upon them on that occasion; the shells and Reletons of fea-fish, and fea-monsters of all kinds. The Alps, the Apennine, the Pyrenees, Libanus, and Atlas, and Ararat, every mountain of every region under heaven, (where fearch hath been made) from ' Japan to Mexico, all conspire in one uniform, one ' universal proof, that they all had the sea spread over their highest summits. Search the earth; you shall find the mouse-deer, natives of America, buried in Ireland; elephants, natives of Afia and Africa, buried in the midst of England; crocodiles, natives of the Nile, in the heart of Germany; shell-fish, never ' known but in the American feas, together with entire 'fkeletons of whales, in the most in-land regions of

Revelation examined with Candour, Vol. I, p. 192; and for the truth of the subsequent particulars, and many more equally surprising, the reader may consult Dr. Woodward's, Dr. Scheuchzer's or Dargenville's Writings, or indeed any other eminent Author on the Subject.

England; trees of vast dimensions, with their roots and tops, and some also with leaves and fruit, at

the bottoms of mines and marles; and that too, in

regions where no tree of that kind was ever known to grow; nay, where it is demonstrably impossible they

" could grow."

This has been thought by feveral to be the chief. and indeed the only argument, that could be brought in proof of an Universal Flood, and hence it has been opposed by every objection, that the infidel could About a century or two ago it was urged, that these fossil Animals and Vegetables were not really what they appear to be, but only Mock-forms, or representations of such things, caused by a lusus natura or an accidental Sporting of Nature underground. But fince this affair has been more accurately inquired into, and collections of sea and land Productions been made from every part of the globe, and compared with the fossils of the same kind, such a nice refemblance and exact agreement has been found between them, - 'The fossil ones being of the same size that the others are of, and of the same shape pre-' cifely; of the same substance and texture; as confisting of the same peculiar Matter, and this constituted and disposed in the same manner, as that of their respective fellow-kinds at Sea: the tendency of the fibres and Striæ the fame: the composition of the Lamella, constituted by these fibres, alike in both! the same Vestigia of Tendons (by means whereof the Animal is fasten'd and join'd to the shell) in each: the fame Papilla: the same Sutures, and every thing else, whether within or without the shell, in its cavity or upon its convexity, in the fubstance, or upon the furface of it: answering all Chymical tryals in 'like manner as sea-shells do; their parts when disfolv'd have the same appearance to view, the same

imell and taste; they have the same vires and effects in medicine, when inwardly administer'd, to animal bodies; Aqua-fortis, Oil of Vitriol, and other like Menstrua, have the very same effects upon both. Such an exact agreement as this, I say, being found between the fossil and natural bodies of the animal and vegetable kind, it is now universally allowed that the fossil are, what they appear to be, the Remains of de-

stroyed Animals and perished Vegetables.

And at present a prevailing opinion is, that though these bodies are what they appear to be, yet those, that seem to have belonged to the sea, were never of marine production, nor the vegetables, the growth of the earth, but both sorts were produced and formed in the places where they are now found, the semina of these things having been placed in and dispersed throughout the whole globe of the earth at the time of its Creation, when all things were consusedly mixt together; and since that time these semina have occasionally shot out, grown and increased by some plastic

yirtue or power.

But till this plastic virtue or power be further shewn, and proved to exist, it will be looked on by all sensible persons to be no other than the lusus naturæ, or an occult Quality of the Ancients. And with regard to the Semina of these bodies being placed in the earth at the time of the Creation, when the whole earth was in a dissolved chaotic state, it must be remembered (if we follow the Mosaic account, which I have already shewed is the only true, p. 78, &c.) that the semina of these things were not made till after the earth was consolidated and dry land bad appeared (Gen. i. 12, 20, &c.) so that they could never have sunk through the earth at that time: and if it be supposed that some of them sunk through after, it must have

WOODWARD's Nat. His. p. 23.

been through the eracks and crevices, not the folid body, of the earth; but unfortunately for this opinion there are scarce ever any of these bodies, even in a fossil state (never any in a natural) to be found in the cracks and crevices, but commonly all fixed in the folid strata; and as that part of the strata which immediately furrounds these animal and vegetable bodies, has the express image of the outsides of these bodies delineated upon it to the nicest exactness, it is certain that the Rock, Stone, Clay, &c. that contains these bodies, was formed and hardened after them; as certain as that the impression of a Seal upon Sealing-wax was posterior to the seal; and both formed after a different manner, at different times, and in different places. Befides, as Fabius Columna argues, · Natura nibil facit frustra, Nature makes nothing in vain; but these teeth, bones, shells, &c. were they thus formed in the earth, would be in vain; for they could not have been of any use as teeth, neither could the bones have been of use in supporting of any animal. Nature never made teeth without a jaw, onor shells without an animal inhabitant, nor single bones, much less pieces of bones, teeth, &c. no not in their own proper element, much less in a strange one.' Therefore the places where these bodies are now found, could never have been their original. in order to shew that the fossil shells, bones, teeth, &c. that so exactly resemble the marine ones of the fame species, were really the product of the sea, and not formed in the places where they are now found, I shall make use of a few arguments as they are judiciously drawn up by Dr. Woodward in his Nat. Hift. of the Earth illustrated, p. 151. "First, the (fossil) shells, which are digged up in places, and found lodg'd in matter, fit to preserve them, and which therefore are firm, found, and have less felt the injuries of time, vield still a true marine falt such as recent shells taken

out of the sea, or cast on the shores, are wont to yield. 2dly. There are also found in the earth the teeth of fishes ground down, and worn away, in the very fame manner as the teeth of those kinds of fishes, taken at fea, usually are, by chewing their food, 3dly. The shell-fish called the Purpura, has a tongue of a confiderable length, terminating in a hard boney sharp point, with which, as with an augre, he bores holes through the shells of other shell-fish, and feeds on the fubstance of them drawn forth through those holes. Now there are commonly found in the earth, among others, shells bored thorow in the manner above described, whence it is certain that those shells had once living fishes in them, and that those fishes formerly lived in some place, where also there were Purpura to feed on them: and that place could be no other than the sea. 4thly. It is common to dig up the shells of Oysters, Conche, Pettines, and other Bivalves, which retain plain marks of tendons, and other figns which undoubtedly shew that they had once living creatures in 5thly. Lastly, The Echimitæ, Conchitæ, Chochlitæ, and other bodies of that kind, confisting of stone, flint, spar, and other mineral matters, which every way match the fize, and exhibit the perfect refemblance of the interior part of those shells, from which they have deriv'd their names, could never have been fo formed, moulded and shaped, had not those shells been quite empty, But there are other bodies also, of which I have famples by me, formed likewife of stone, slint, and spar, which represent only pieces, or fome particular parts of the Echinitæ, Conchitæ, and These, any one, at first fight, may Cochlitæ. plainly difcern were formed in the shells, while they had yet their fishes actually in them: and therefore could receive only fo much of the stoney, slinty or fparry matter, as would fill up the parts which were

empty or vacant, and not possessed or taken up by the fish. Thence it is, that those stoney, slinty and sparry bodies bear only the resemblance of that vacancy, as having been moulded in it. Now these bodies plainly shew those shells to have had fishes formerly in them: and at the same time point forth to us the true origin of them, viz. that they were not produced in the places where they are now found, but

were at some time brought all from the sea."

OTHERS indeed allow that the fosfil animal and vegetable bodies are really what they appear to be, and that the marine ones were produced and bred at Sea; but then they suppose that they were brought to land by partial deluges, or occasional inundations of the fea. But certain it is, there are no records in history of any fuch inundations that can by any means be applicable, either with respect to their Antiquity or Extent, to the phænomena of this kind observable throughout the whole body of the Earth. The Pyramids of Egypt are reckoned to be some of the most ancient structures in the known World, and situated also in a Country that is frequently overflooded by the Sea, and yet the Stones, of which these Pyramids confift, abound with fossil marine shells and corals; fas I have feen in several samples of these stones, and have fome specimens by me, given me by Dr. Shaw) and these shells and corals are of the same kind with those that are now found in the regular strata of the earth in the neighbourhood of these buildings. So that it is evident that these marine bodies were brought to land before the time of erecting these Pyramids. Again, Steno (who was an Italian, and wrote about a Century ago) in his Prodromus to a Differtation De Solido intra Solidum naturaliter contento, i. e. Concerning Solids

[·] See SHAW's Travels, p. 416.

naturally contained within Solids (p. 87) fays, That in the foundation-stones and walls of the City of Volaterra (the ancient Seat of the Etrurians) there are various forts of shells; and the shells are of the same species with those that are found in the stone and natural beds of the Hill on which the City formerly stood. Now is is certain that Volaterra was a place of great note and power, long before the foundation of Rome: now fomewhat more than two thousand five bundred years fince Rôme was first founded. And certainly several centuries must have passed from the time that the Etrurians first settled there, till their City had gained the character and fize it had, when Rome was first began to be built. Now if we allow but five or fix bundred years for the completion of this, it will then follow, that these shells have remained there for at least three thousand years. And when we consider that this will advance the proof of their existence to within one thousand years of the very time when the Deluge of Noah happened, furely none will be at a stand to attribute the time of their transportation to this Caufe, which in every respect was answerable thereunto, and prior to all accounts of partial Floods. But when we take in the additional circumstance of the extensiveness of the Effects of that Deluge in which these things happened, the matter will foon appear incontestably clear. Let any one read the argument in proof of an Universal Deluge as stated and described p. 251, and he can never, with the least shew of reafon, attribute the Effetts there related to partial Floods. Besides; I have already laid down such marks as will demonstrably shew, how far the Sea in any place has occasionally covered the land, and that the effects of an Universal Flood are visible where partial inundations never reached (p. 230); and also have shewed, that the marine bodies that are discovered at land are

found in such places, viz. in the folid substance of the strata, where partial floods or any mere inundation of the Sea, how extensive soever, could never have placed them, and that these bodies are scarce ever found in those parts, viz. in the cracks and fissures of the earth, where such floods would most naturally have thrown them (p. 254); which is an unanswerable argument against this hypothesis: and other particulars, to shew the weakness of this Supposition, will occasionally oc-

cur in the process of this treatise.

Bur before I finish this head, it may be proper to take notice of Monf. Le Cat's argument, against the opinion of the fossil animal and vegetable bodies being placed in the earth at the time of that Deluge which is recorded in Scripture: 'The waters of the Deluge, faith he, according to the affertion of Scripture itself, exceeded the highest mountains by fifteen cubits; whence it must follow, that these mountains were before the Deluge. Now in the bowels of these mountains are found animals inclosed in the stones ' and quarries of which they confift. Therefore those animals, inclosed in the bales of these mountains, ' must have existed, together with those mountains before the Deluge. The Deluge then is a Revolu-'tion which does not account for these phænomena.' But Mons. Le Cat seems not to have considered, or not to have known, that the mountains that were before the flood and those that were after, were not one and the same, but formed at two different times, and with respect to the point in question, vastly different. The mountains that were before the flood were formed by the retreat of those waters that first covered the furface of the earth, and permitted dry land to appear, on the third day after the Creation, and before any animal or vegetable body was made; and therefore no fuch could possibly have been found in those mountains.

The mountains that were formed after, or at the end of the Flood, had their origin at a time when the earth was replete with animal and vegetable bodies; and as all the folid structure of the earth had just before been totally diffolved (and so all the ante-diluvian mountains wholly destroyed) but these animal and vegetable bodies preserved entire, it could not but be that in the fettlement of this dissolved earth these bodies would be found involved therein, and buried at the lowest depths; which could not have been the case with regard to the mountains before the flood! for the reasons above-given: and therefore Mons. Le Cat's argument which he is pleased to say is founded upon a 'Reason which admits of no reply,' is; in short, founded upon a false matter of fast, and so destroys itself.

Thus I have shewed, by several general and extensive arguments, the certainty of an Universal Flood, or that this earth has been covered to an immense height by an inundation of water, and moreover have proved, that this water was brought from the Abyss beneath, and have shewed that in several other respects the effects of the Flood, so observable on and in every part of the earth, are exactly consonant to; and cannot with propriety be attributed to any supposed Event of this kind, other than that Deluge which happened in the time of Noab, and is described by Moses in his writings.

In the process of these arguments the reader cannot but have observed that I have been very careful and industrious in collecting a variety of testimonies (besides my own) from different Authors, who lived at different times and in different places, in order to confirm and establish the chief particulars upon which each argument depends; so that it appears, that there is scarce a region under heaven but what bears testimony to the Universality of the flood: but left the reader should suspect these evidences, or rather, would be fatisfied in this case by nothing less than ocular demonstration. I would defire him to ascend the nearest high mountain to the place where he lives, and carefully examine the upper parts of it, and in all probability he will foon find fome marine extraneous foffil, either a shell, tooth, bone, coral, coralline, or else some in-land pebbles, trains of stone, &c. or at least perceive some one or other of the marks already given, whereby he will foon be fatisfied that this mountain has been covered to a confiderable height by an inundation of water: and if this Mountain was thus covered, certainly the Combs, Dales, and Vallies beneath, (which were formed by Currents of water from this mountain) were equally inundated: or rather, fince the parts of water have no tie or connection with each other, but naturally fall away or are carried to the lowest places first, it could not but be that every Comb, Dale and Valley, nay Hill and Mountain over the whole surface of the earth, that was of equal height with this, must have been equally covered. So that, in short, any person, at this day, by giving himself only the trouble of visiting the nearest high mountain may have full proof that that mountain was covered, nay, formed by water; and if any one mountain upon the earth was thus covered and formed, he will readily conclude that they all have been fo; and hereby have, from any fingle Mountain, undeniable testimony that all the high hills and mountains under the whole heaven have been covered by an inundation of water.

THIRDLY,

I AM now come to the third Division of this Section, wherein I am to shew, that, during the above-mentioned Flood, the Earth, was not only covered by water, but totally dissolved, all the mineral and metallic matter being reduced to its original corpuscles; and assumed up into the water; so that the whole terraqueous globe once constituted one fluid Mass or Colluvies.

THE Effects of this Diffolution are visible on, in, and throughout the whole body of the earth. For

- 1. The very outward form of the earth indicates as much. I have already shewed that all the Cavities upon the earth's surface, such as Combs, Dales, Vallies, &c. were once filled up with beds of matter of the same kind, and placed in the same manner, as their corresponding strata in the sides of the adjacent hills or eminences; fo that the earth was once regularly round without any of the inequalities of hills and dales. But this form could never have been the refult of matter fettling in large separate masses or detached rocks: had the parts of the earth subsided in fuch enormous fragments as these, the surface of the earth would have been almost as irregular as it is at present. But as the earth, when the parts of it first settled, was perfectly spherical and all the strata lay upon each other, with the nicest exactness, in parallel circular lines; fo it must follow, in order that such a regular disposition of things might take effect, that the whole was diffolved, and subsided in the minutest parts or primogenial atoms.
- II. THE spherical shape of the earth also may be justly esteemed as the natural result of the equal pressure of the Air upon its once shuid, dissolved parts.

It is certain that whatever is in a fluid state, and is surrounded and supported by the air, is of a globular form; and as the earth is not only buoyed up, but at present pressed on all sides by the air, and was at sirst formed by its circumambient force, and as this sorce is not sufficient to reduce Solids (if of a different sigure) into a regular spherical shape, unless the parts thereof are so intimately mixed with a sluid, as to be equally susceptible of motion, so the earth, unless it had been dissolved, and the parts of it blended with a sluid, could never have been modelled to a globular form.

III. THE Solidity, or Cohelion of the folid parts of the earth, is another proof that the whole has been dissolved and immersed in a fluid. If you take any of the folid substances of which the earth confists, though reduced to the minutest fize possible, and pressed ever so close together, yet if the mass is free from all moist or sluid particles, the whole will still remain in a manner disunited and the parts thereof eafily separable from each other, being no other than a congeries of fine dust or dry Sand pressed together; and in order to bring the parts into fuch a close contact and cohesion with each other as to form a compact Solid, there is a necessity of adding, or rather of intimately mixing with these substances, some sluid body; in which and by which (on account of the lubricity of its parts) the particles of the Solids might be so moved and shifted every way, till at last similar furfaces might meet, press out the fluid between them and come into closer contact with each other than they were before; and this compressure and union still continuing and encreasing by the farther expulsion of the moist particles, the mass would at last be brought into a much narrower compass than it at first

occupied, i. e. the parts would be brought into a closer contact with each other, and so the (before) loose, separate, detached Solids be united into one firm compact body. And if this is the general process of Consolidation in the various substances of the earth that we can make any trials or experiments upon, we may reasonably conclude the same of the whole; and also that the firmer, finer, and closer any body is at present, the greater has been the dissolution and division of its parts.

IV. A FOURTH argument that the earth has been in a loose fluid state may be drawn from the consideration of the Veins in some sorts of stone, particularly in the hardest and most beautiful marbles. It is common to observe in such, a great variety of matter in the greatest variety of forms and directions; in some part matter that was lighter (to speak in the common acceptation of words) than the neighbouring, preffed down below the place due to its specific gravity, and afterwards elevated to a confiderable height, till at last meeting with matter that was heavier and making its way downwards, the whole shall be curved, by the ascent of the one and the descent of the other, into a vast variety of arches, consisting of the finest and most delicate lines: in other parts you may fee streaks or feams of different substances proceeding on, as it were, horizontally, in nearly streight lines, till they have been met and opposed by other matter in a contrary direction; and at the point of conflux both species of matter turned back and deflected in all the variety of wave-like dispositions that can well be imagined to have happened to two streams of water, meeting each other in opposite currents: and in short you may see all the diversities of forms and figures in the Solid that any kind of agitation in a fluid could possibly difplay: and therefore we cannot but conclude, that the Solid was once in as great a state of fluidity as if it had been a Fluid itself. And though indeed these greatly variegated beds of stone are but few in comparison of the strata that compose the whole body of the earth, yet there are very few strata but what have fome fuch wave like streaks or feams; and as these beds of stone are sometimes found at considerable depths in the earth, and confift of layers of equal thickness throughout, it had been impossible that they should have been in a state of sluidity, unless all the superincumbent strata had been equally sluid, or not formed: nay, when we consider that these veined beds of stone generally constitute the hardest species of marble, we may reasonably conclude, that if they were disfolved, all the other strata of the earth were equally in a state of dissolution.

v. It is common to observe in places where different strata meet, that there has been such an intimate mixture of both, as could not possibly have happened without a free and eafy interchange between each, and confequently not without a Diffolution. Thus, for instance, in a country that abounds with chalk, where the chalk ends, and a different foil and different strata begin, (suppose) that of Free-stone, there is commonly to be feen upon the edge of thefe two countries a kind of substance between Chalk and Free-stone, confisting chiefly of Chalk upon the Chalk-fide of the Country, and principally of Freestone upon that of the Free-stone Country; so that on the one fide, there is a coarse fort of Chalk, on the other a fine folt species of Free-stone: the former fort gradually coarier and coarier the nearer it approaches the Free stone, the latter finer and finer the nearer it is fituated to the Chalk. And this I have obferved for feveral hundred yards upon the furface of the earth, and for a confiderable depth within it. A fimilar kind of Conjunction or Intercourse I have seen also between the strata of Sand-stone and Limestone, between Flag-stone and Iron-stone, and indeed every kind of strata, where they happen to meet in considerable quantities, or large tracts of land abound with them. And generally, the greater the quantities that meet, the more extensive the interchange appears to have been, and of course the Difsolution the greater.

VI. THE Formation and Situation of Nodules plainly evince that the Earth has been in a fluid, diffolved state. What these are I have already in part shewed, and also how to distinguish them from sea or in-land pebbles (p. 196). But besides the species of Nodules principally there spoken of, viz. Those of a stoney or mineral nature, there are others of the metallic or semi-metallic kind, such in particular as the Pyrites. This body is found in great plenty; efpecially in chalky countries; and commonly of a round form outwardly; and its inward texture shews, that itself and all the matter around it has been in a fluid state; for it consists of a multitude of long and extremely fine spiculæ, closely united together, and all driven to a center; and the substance of which it is formed, is of a quite different nature and kind from the matter or stratum in which it is usually found, and bears but a very small proportion to the stratum. Now this body must either have been formed out of the stratum, and afterwards have settled in it, or else been originally formed where 'tis now found: and in either case there must have been a dissolution or separation of the parts of both. For wherever the body was formed (either in the stratum where it now lies,

or in any other above it) as it consists of matter of fuch a peculiar kind, and is of fuch a particular shape, as plainly to shew, that its atoms, during its formation, were collected together from above, from beneath, and from each fide (otherwife it could never have been of a radiated globular form), so it must follow that there must have been a separation of its own parts and also of the matter around it, in order to permit a free and easy passage for the access of one and recess of the other fort of matter. Nodules there are that were undeniably formed out of the stratum where they now lie, and afterwards fettled in it; especially those of the coated kind, and in particular where the coats or crusts of the nodules confift of the fame kind of substances, respectively, with those that constitute the strata immediately above the bed where they are now found. Now it is certain that these bodies could never have obtained teguments of the same species of matter, and placed in the same order from the center, with the superincumbent strata, unless they had passed through them; for the beds wherein they are now found have no fuch matter in them (except what immediately furrounds these bodies themselves), and the strata underneath are frequently of a very different kind from either; fo that they must have passed through the superior strata, and have procured their coats in their passage; and if so, those strata must undeniably have been soft and fluid, otherwise they could never have passed through them and have collected coats from each, as also must the bed have been fo, where they are now found, otherwife they could never have subsided and settled in it: so that the whole was once in a state of Fluidity.

vii. But the most striking proof of this kind may be drawn from the extraneous tossils or those bodies

that are now found in the earth, and which do not properly belong to the places where they are now found, fuch as corals, fea-shells; the bones, teeth, &c. of fea and land animals; plants, trees, &c. Now I have already shewed (p. 254) that the former fort of these bodies were produced at sea, and the latter, at land; that the broken parts of these bodies once constituted complete forms; that the bones, teeth and shells once belonged to living animals, furviving in their proper elements; that the leaves and branches of the vegetables once grew upon their proper plants and trees: so that the marine productions were originally bred and formed at the bottom of the fea; the terrene, upon the furface of the land: but at prefent these bodies are found lying promiscuolly throughout the whole folid body of the earth; fome at the tops of the highest mountains, others at the bottoms of the deepest cavities that were ever dug; and lying too in fuch a manner as to make but one common mass with the strata in which they are found; and this, not only in the fofter kinds of strata, as those of clay, chalk, &c. but in the inmost substances of the hardest and closest marbles; and generally, the harder and more compact the matter is, the closer and more intimately united is the extraneous fossil; which, if a tooth or a shell, has not only the exterior surface or outward lineaments most nicely delineated in the rock, but the infide totally replete with the same substance, every, even the smallest vacuity and slightest indenture being filled up with stoney matter; and in some cases, where the shell has been closed, the cavity through which the matter passed or entered into the shell is inconceivably small; in others the various convolutions and different concamerations are fo many and yet so minute, and the passage leading through them so extremely small, as not to exceed in size the

orifice of a capillary tube in the human body, and yet each and every one of these totally filled up with the stoney substance; so that the matter contained within the shell exactly resembleth any liquable substance cast sluid into a mould. If the extraneous fosfil be a Leaf, then not only the upper and under-fides are most accurately impressed in the rock, but the very pores filled to the inmost recesses, and the leaf as turgid and as much fwelled by the penetration of the stoney matter, as if it had been for a long time foaked in, and most intimately permeated by, the particles of water. Now for a substance,-The texture of which is inconceivably delicate and complicated, and even its largest pores invisible to the naked eye, and which once grew upon the furface of the earth,-to be thus immerfed in, and penetrated by, the folid rock, and to have funk through the folid body of the earth to the greatest depths we ever dig, is an undeniable testimony that the Earth was once as fluid as water itself. And these extraneous bodies point out also the time when this Dissolution happened, viz. at the Deluge, and not at the Creation, as some have imagined (fee p. 253).

of the Dissolution is drawn from the internal Structure of the shell of the earth. It is well known to those that are in the least conversant with philosophical matters, that all the various substances of which the main body of the earth, consists, are disposed (as the Chymists call it) strata super strata, or layer upon layer; and it is also well known that such a Disposition of things could naturally be the result of nothing but the settlement of these bodies in a dissolved state through such a Fluid as Water. If, for instance, you take a certain portion of these bodies, and pulverize them to the finest de-

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gree imaginable and mix them as confusedly together as possible, and let them fall through a dry Fluid, such as the Air, they will settle just in the same confused state as they were at first, and without the least appearance of forming frata: if, on the contrary, you permit them to subside through water, they will fettle more or sess in parallel strata. Indeed it requires twenty or thirty times the Quantity of water to earth to make this layer-like subsidence tolerably apparent, even in the mixture of but three or four bo. dies. But the greater quantity of water you use, and the finer you pulverize the substances, the more apparent and regular the strata will be: yet after all the Trials that can be made, the diffinction of strata will never be fo exact as they are in the body of the earth. It is not uncommon to fee in the earth vaftly large beds of stone, coal, clay, &c. lying each upon the other, at one depth the stone above the coal, at another depth the coal above the stone, in one part the clay above each, in another under all, &c. and yet each of these strata so distinct in themselves, and fo nicely forted, that the stone contains none of the coal, nor the coal any of the stone, nor does the clay partake of either (only each stratum a little tinged on the fides next to the adjoining strata). Now the quantity of water requisite for effecting this must have been immensely great, and the whole body of the earth must have been dissolved to its very elements or primogenial atoms, to produce such a regular affortment of strata.

Having thus proved that the whole structure of the earth has been unhinged, the constituent parts thereof separated one from another, and assumed up into a large body of water; I shall now draw some conclusions from what has been advanced.

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1. Since the quantity of water requifite for the affumption of the diffolved parts of the earth, and the subsidence of them in regular strata, must be vastly greater than what appears of this Fluid on the furface of the earth or in the Seas or Ocean, there must be an immensely large body of water in the inside. I have obferved already indeed (p. 100.) that the water on the furface of the terraqueous Giobe occupies more than two thirds of the earth's superficies: but then it must be remembered, that the land is still continued; in a great measure, under this water: and from the appearance of islands in the midst of large seas, at a great distance from the sea-shore, and from the many known ridges of mountains that run under the fea, and from the time, that, according to scripture, the waters of the deluge were retreating from the furface of the earth, we must conclude that the apertures in the feas thro' which the water descended are, comparatively speaking, but small: fo that the shell of the earth is in a manner continued quite under the feas (except where the above apertures occur). And probably the land under any sea equals in bulk that sea itself. So that upon a thorough inspection of the whole shell of the earth, the terrestrial parts vastly exceed the waters. And though there appears water enough upon the furface of the globe abundantly sufficient for barely covering the dry-land; yet there by no means appears a quantity sufficient for dissolving or assuming up the dissolved parts of the earth, and permitting them to subside in the manner we now find them: and fince this quantity does not appear upon the furface or within our reach, it must be in the inside, and there constitute an abyss of water.

2. FROM the quantity of water necessary for the sublevation of the dissolved parts of the earth, we see

that all folutions of a deluge, without having recourse to an Abyls, must fail or not answer the effects visible throughout the whole body of the earth. And hence, I am furprized, that a modern ingenious Writer, (whose works I have made some quotations from in this Tract) should attempt to solve it without the introduction of fuch means. He imagines, that the water of the Sea only would be fufficient for the work. And in order to account for the elevation of this water over the tops of the highest mountains, he supposes, That the Omnipotent hand of God or first Almighty Cause lifted up the bottom or bed of the sea, and by that means poured its water all over the earth; and by letting it drop down again, restored all things to their former fituation: and fo the deluge was over. This he is pleased to call the easiest and most eligible method of transacting this event: But I suppose that all methods are equally easy to Omnipotence; and I could mention an hundred other methods by which God might have deluged the world, and yet neither of them the true, though all equally easy to the first Cause. The point to be decided is, What was the method Gop did use? If we can discover this, we may depend upon it, that That was the most eligible. Now God himself tells us, that in order to destroy the earth by a flood of water, be broke up the Fountains of the Abys, and opened the windows of heaven (or the passages of the air through the shell of the earth) and so unbinged and dissolved the whole globe. This I have shewed to be the Case from the state of the earth, from the Center to the Circumference; and all nature bears ample testimony to the truth of the Word of GoD: and yet Mr. Borlase is pleased to ridicule this method and characterize it as attended with ' the egregious absurdities of

Rev. Mr. BORLASE in his Natural History of Cornwall, p. 78.

'an Abys, apertures, disruptions of the shell, and the 'like:' I was forry to see such words fall from such an Author, and as he gives us reason to think that he will write something farther upon the subject, I hope he will kindly take this friendly hint, and re-consider the affair.

2. From the certainty that the whole globe was diffolved during the deluge we may see the impropriety of his Lordship's opinion,—that the superficial parts only were affected during that catastrophe, and that the Rubble and Slutch left by the deluge on the furface of the earth are the only marks of its devastation; but we have feen that the very form of the earth throughout, its internal conftitution, its difpofition in strata, and these strata abounding with the exuviæ of land and sea animals, &c. manifestly demonstrate its Dissolution in every part. indeed there is one circumstance even in the Rubble and Slutch that indicates the Dissolution of the whole earth, and therefore may not improperly be mentioned in this place. After all the refearches I could make, or the best testimonies I could procure, I could never learn that there was ever any ante-diluvian artificial thing, either utensil or weapon of stone, iron, or brass, &c. found in the Rubble as naturally left there by the waters of the deluge. All things of this kind that I have feen were evidently found in places where the Rubble had been disturbed, fuch as in old castles, camps, &c. and therefore the things themselves might have been posterior to the Deluge. And though the Rubble itself lies in an irregular manner (with respect to the regularity of Strata) yet it is not fo irregular, but that had it been disturbed or broken through by digging, &c. the rupture would have been visible:

See of this Tract p. 14, &c.

for as it consists of streaks and seams extended lengthways or inclined in wave-like directions, any perpendicular irruption must have been discernible. So that if the Rubble, lest by the deluge, naturally contains no metallic or mineral substance worked by the art of man or engraven by his device, we may then justly conclude that all such instruments, and of course all matter of the same kind with them, i. e. all the metallic and mineral substances in the whole body of the

earth, were dissolved during the deluge.

4. It may feem strange to some, how it was possible that all the dissolved parts of the earth should float in or be supported by such a thin substance as Water. But to folve this difficulty, let it be remembered. that they were dissolved, and also to their finest parts or original atoms. Salt and Sugar, when in maffes, will both fink in water, but when the parts thereof are difunited and separated one from another, they are easily fustained thereby: and the quantity of Salt that is fwimming in the waters of the Ocean is inconceivably great, and if collected in one mass would be immensely weighty. Then too, there is no water whatever, even the most limpid, but what contains a great variety of earthy particles, as chymical experiments undeniably shew: Nay, that there is a species of water or of a fluid (Aqua regia) that will dissolve and support the dissolved parts of the heaviest of terrestrial bodies, Gold; and though the particles of the gold shall be swimming in or dispersed through every part of this fluid, yet the whole shall be as clear as chrystal. Or, what is more to the purpose, a Thunder-cloud, big with a deluge of rain, and containing a valt variety of terrestrial substances, is yet supported, at a confiderable distance from the earth, by such a thin sluid as the air: now according to Scripture, at the time of the deluge there was a large body of expanding

air in the infide of the earth, acting or preffing from beneath upwards, i. e. from the centre to the circumference, which therefore would counter-act and in fome degree abate the force of the perpendicular preffure of the air or expanse upon the surface of the earth, and by this means lessen the power, of, what is called, the Gravity of bodies, and so make them lighter; as is the case in rainy or misty weather, when bodies do not weigh so heavy as at other times, and when, on account of these ascending steams impeding the pressure of the atmosphere, the mercury also in the barometer fubfides and finks. Such being the state of the earth during the time of the deluge, it was really no more wonderful, that the water of the terraqueous globe (which in all probability exceeds in bulk feveral thousand times the quantity of earth) should sustain all the dissolved strata thereof, with the exuviæ of animals and vegetables then destroyed, than that a thunder-cloud should contain and support a vast variety of mineral and metallic effluvia, intermixt with hail-stones of various sizes; for in both cases a body of expanding air was the basis and prop: and Air, as I have already shewed (p. 34), will keep water above as well as under it. That the state of the Earth and Air, during the time of the deluge, was really different from what it is at present, is very manifest from several effects, then transacted, and now visible, in the terraqueous globe. Certain it is, that neither the strata of the earth, nor the heterogeneous bodies enclosed therein, do lie according to the Laws of specific Gravity, or as bodies would settle at present. It is as common to find heavier strata above lighter as lighter above heavier: and the fame kind of strata (after the interpolition of both heavier and lighter ones) repeated; and remitting the whole in a tetrograde order. So that this phænomenon feems plainly

to point out the actions of two Agents, one that acted from above downwards, the other, from beneath upwards: from whence it should follow, that at the same time as the downright perpendicular pressure of the Air separated and precipitated any species of terrestrial atoms through the waters of the deluge and formed them into a stratum, the same also did the Air from beneath, with respect to the same species on the opposite side. To effect which also there must have been a total dissolution of the terrestrial Globe, otherwife there could never have been such a free and easy access for the Air to and from the Center. what further shews, that there was a body of Air or fome Agent at the center of the earth during the time of the deluge, which counter-acted the force of Gravity, is, the manner in which the diluvian Spars and Crystals are at present found; the shoots of such being in some places perpendicularly upright, in others varied in all kinds of direction, but generally speaking they are in an borizontal position, so that the angles and columns meet in and interfect each other from the fides of the vein or fissure. But as the Spar that has been formed fince the deluge, or, as the Miners call it, that is forming at this day, is always pointed downwards, (unless where the rock intervenes, and diverts its natural course) hanging like icicles from the tops and arches of caverns, grotto's, &c. in form of Stalattitæ; it is evident that the pressure of the Air downward is at present stronger than it was at the time of the Deluge: and as many of the diluvian Spars and Crystals are pointing perpendicularly upright, it shews that the force of the air from beneath upwards was then stronger than it is now: and of course that the gravity of bodies was less, and so more easily sustainable in the waters of the flood than fuch bodies would be now.

[276]

FOURTHLY,

HAVING thus proved that all the solid structure of the earth has been dissolved, and the dissolved parts thereof assumed up into, and supported by, a large sphere of water.

I AM now to shew, that all this dissolved matter, together with the animal and vegetable bodies inclosed within it, subsided again, and formed the present solid strata of

the earth.

I HAVE observed already (p. 156) that there is such a close Connection between the several parts of the Subject I have been treating, or the Heads I have been naturally led to divide it into, that very often one and the same argument would prove several of these heads; and so it has come to pass that the discussion of the tormer articles of this Section has in a manner exhausted this last. For, in short this last depends entirely upon the truth of the Case as reprefented in the former. All the arguments that I have there brought in proof of the Flood, the Dissolution, &c. were entirely taken from the present state of the If therefore the foundation, on which those arguments were built, was found, or the state of the Earth justly given, little more need be faid in this And in order that the reader should not rely barely upon my testimony, I have subjoined, under each of the former articles, the testimonies of a variety of authors, who lived in different times, and in very distant places: so that in a manner the voice of all mankind, and the face of the whole earth, fpeaks the truth of what I have endeavoured to prove.

'What weight these testimonies ought to have (to speak in the words of the celebrated Author of Reve-

^{&#}x27;lation examined with Candour) the reader will best

^{&#}x27; judge:—Testimonies so numerous, so various, so disconcerted, and yet so connected, is it possible,

that they can deceive? Could all nations conspire with all nations, and all ages with all ages, to imopole upon themselves, and their posterity? Could the religion of the true God, and the religion of s the Syrian goddess! the Jews and the Heathens, that hated them! Moses and Melo his enemy! tradition conspire with history, and history with mythology! men of all characters, complexions, conditions, and persuasions! Plutarch with Berosus, · Benjamin the Few with Chrysostom, and Lucian with both! Plate with Pliny, and Die with Falconerius! the imaginations of poets, and the experiments of ' naturalists! antiquity, poetry, philosophy, and sphilology! wifdom, and folly! truth, and fiction! regions unknown to one another! and regions that · never heard of one another! the Greeks, and the Hottentots! the Persians, and the Banians! Asia, with the 'isles of the Gentiles! and America with both! all confpire to establish one universal delusion!—And ALL "NATURE join in the attestation; produce all her ani-' mals, and all her vegetables, all her heights, and all her depths, her mountains, her vales, her levels, to vouch one universallye, with all the IRRESISTIBLE EVIDENCE OF TRUTH. Surely those who see not the Force of the Evidence in this particular must wilfully shut their eyes against

Surely those who see not the Force of the Evidence in this particular must wilfully shut their eyes against the truth; and may justly be characterised with a set of people (if they are not themselves the very people) spoken of by St. Peter, —In the LAST DAYS shall come Scoffers walking after their own lusts, and saying, where is the promise of his (Christ's) Coming; for since for as it should be rendered, except that the fathers

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b z Epist. iii. 3.

See Hammond on the text.

fell afleep, [fave only, that our fathers or all the men that have lived upon the earth are dead, and others now live in their stead all things continue as they were from the beginning of the Creation; i. e. there hath been no material alteration in heaven or earth that can evidence the Interposition of Providence in the affairs of men, either to punish the wicked or reward the good, and therefore we may do as we please, walk after our own lusts, &c. For this (continues the Apostle) they are WILLINGLY IGNORANT OF, That by the Word of God the beavens were of old, and the earth standing out of the water and in the water: whereby the World that then was, being overflowed with water, perished: that is, the Eyes of their understandings are so blinded by a wilful pursuit after their passions and lusts that they cannot fee, or will not acknowledge, (if they do) the plainest truths in Nature; they will not own, what all the world besides confesseth, what all ages have maintain'd, what is faithfully recorded in the written word of Gop, and what is engraven in the deepest characters all over the face of the earth, and what they may have (which infidels fo often demand) ocular demonstration of the truth of, viz. THAT THERE HAS BEEN AN UNIVERSAL DELUGE, and that the Threatning pronounced by Goo, four thousand years ago, on a wicked race of mortals was really accomplished. viz. And God said unto Noah, the end of all flesh is come before me, for the earth is filled with violence through them, and I will destroy them, i. e. the inhabitants, with the earth that bare them: and which through its abundant fertility (abused by them) furnishes provision only for their lusts, luxury, and idolatry. The Evidences of this Destruction are such, that the very bodies or bones of the persons thus destroyed, together with the

^{*} Gen. vi. 13.

animal creation that perished with them, are still remaining as standing, striking Monuments of this execution of Divine Wrath upon a wicked world, and are to be feen in every part of the Earth, not only upon the furface, but in the very folid fubstance of it, not only in vallies and dales, but upon the tops of the highest mountains and eminences, and buried also to the greatest depths that human art or labour has ever penetrated. Certain then it is that this whole earth has been destroy'd, all the folid structure of it unhinged, broken to pieces, and reduced to its original loofe chaotic state, and afterwards formed anew into its present solid, beautiful and convenient shape. Effects these so great! that they could never have happened of themselves, never have been the performance of blind inanimate matter. Matter cannot even destroy itself, much less, when destroyed, form itself anew. These transactions therefore must have been effected by a Being superior to all the Powers of Nature: and they carry in themselves such evident marks of Wisdom, Power, Goodness and Justice, that they not only prove that there is a GOD, but also that He governs the World.

It may not be unentertaining nor uninstructive to the reader, with respect to the subject of this book, if (before I conclude) I present him with a paraphrase in verse of the 104th Psalm, as composed by my father from the true sense of the Original; since that Psalm contains, among other things, a description of the two principal Particulars discussed in this Tract, viz. the Manner, in which the Earth was at first formed, and the Manner in which it was destroyed and formed anew, at the time of the Deluge.

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The Hundred and Fourth PSALM

PARAPHRASED

By the late Rev. Mr. A. S. CATCOTT.

EXERT thy reas'ning powers, my vital Frame,
And grateful praise the great JEHOVAH's name;
Hail thou who ART! resistless in thy might,
Array'd in glory and majestick light!

As a wide tent, extended over-head,
Thy forming hands the vast Expanse out-spred,
Whose binding force the fluid Orb restrain'd,
And reach'd those atoms the loose mass contain'd.
Whence the firm strata, which the Globe compose,
Each over each in mounting stories rose.
Onward it mov'd, impell'd by grains of air;
The wings of winds the floating Orb upbare.
With I double impulse push'd the Spirit's force,
And Light prinæval steer'd it in its course.

As normal being in the plural number, indicates. The Wind or Spirit and the Light or a Flame of Fire were the Agents or Ministers that God made use of in garnishing the Heavens and in forming the Earth, as I have shewed p. 26, &c. of this Tract. As the Works of Nature are here spoken of, it is certainly more natural to suppose the material Angels or Agents are here meant than immaterial and spiritual Beings.

On th' Airs, as bases, he machin'd the Sphere, And firmly bid the folid parts cohere. As yet the Shell beneath the waters lay, And future mountains had not feen the day. At thy command th' affrighted waters fled, And fought, tumultous, their appointed bed. O'er hills they roll'd, and followed the descent, Deep channels tore, and the split valleys rent. There lodg'd, in Earth's capacious Womb, they rest. By the strong Heav'n's expansive pow'r compress'd. Their bound'ries still their raging waves confine, Bound'ries unmov'd by any pow'r but thine. Hence rais'd in steam, they work their secret way, In lowly vales thro' openings meet the day; Or trickling 'twixt the winding mountains stray. Here haunt the Beasts, and find a cool retreat, And parch'd wild Asses quench their thirsty heat. In neighb'ring trees, amidst the leafy sprays, Birds build their nefts, and chaunt their chearful lays. The oozing fprings bedew the mosfy hills, And thence glide down the fertile vale in rills: Hence new in strength the saturated Soil With verdant grass supports the cattle's toil; With various herbs for human use is crown'd, Or yellow harvests load the fruitful ground.

Hence 'rise th' effects of industry and art; Hence bread is form'd the strength'ner of the heart. From swelling grapes the foaming wine is press'd. Diffusing gladness o'er the pensive breast. Oil with youth's bloom renews each fading grace, And sheds fresh glories o'er the beauteous face. Trees, facred emblems, and once Eden's pride, From the same storehouse are with sap supply'd; Cedars, which Lebanon's high fummits grace, Set there by God, " coeval with their place : Lodg'd in whose branches Fowls fecurely rest; And tow'ring firs which yield the ftork a neft. On highest hills the shy Chamois are found; And delving Conies bore the rocky ground. The Moon's fair Light (her Orb by stated force Impell'd' determines periods by its course: The Sun more glorious runs its known career, And gilds by turns each shifting hemisphere. The light goes off, and night fucceeds the day; The beafts come forth, and proul in fearch of prev. With hunger pinch'd the whelps of lions roar, And from their Maker's hand their meat implore. Again the Light irradiates on the Sphere; The Beasts retire to dens, and disappear.

m i. e. Set there by Nature or the Author of Nature, in opposition to those planted by the Art of Man.

Men issuing forth their daily toils attend,
'Till ev'ning-twilight bids their labours end,

O great Jehovah! dreadful, glorious name!
What wonders fill this univerfal frame!
In all thy fovereign wisdom shines express'd;
But thou profusely kind this globe hast bless'd:
How vast the Sea! magnificently spred!
Of Creatures numberless the spacious bed!
O'er the wide level ships pursue their way,
And huge sea-monsters toss the deep in play.
All wait on thee, and thou supremely good,
In proper season giv'st to all their food:
Thou giv'st, They take, thine hand thou open'st wide,
Whence all, that live, with plenty are supply'd.

When once from earth thy presence disappear'd,
Man's impious race impending vengeance fear'd.
Theworld's great course was chang'd; no more supply'd
With vital spirit; all expir'd, and dy'd.
Ev'n Nature's adamantine chain was loos'd,
And things to their primæval state reduc'd.
Soon as thou bad'st the Spirit work again,
And as at first the sluid Orb restrain;
New forms appear'd resemblant of the old,
And Earth was cloath'd with vegetable Mold.

[284]

But he whose emblem GLORY is, whose name JEHOVAH is, for ever IS the same. When e'er his works propitious he surveys, Nature proceeds successful in her ways; But when in wrath his slaming bolts are hurl'd, The mountains smoke, and tremblings shake the world.

So long as Life supports this breathing frame,
I'll sing my Saviour, great Jehovah's Name.
When Thought of him my ravish'd soul employs,
I feel a foretaste of immortal joys.
While short on earth the pleasures are, that slow
From Sin, and sollow'd by eternal Woe:
My vital frame! the great Jehovah bless,
Adore his Goodness, and his Pow'r confess.





APPENDIX.

TUST after I had printed the sheet, relating to the manner in which I apprehend America was first peopled, I had occasion to go to Oxford, and took that opportunity of carrying the sheet with me, in order to have the opinion of a friend upon it. He deferred reading it while I was prefent, and promifed to fend me an answer by the post. In the mean time he sent it to the Rev. Mr. Jones, of Wadenho in Northamptonshire, (a common friend to us both) as having heard that that gentleman had particularly considered the fubject, and had discovered a method of solving the difficulty. Soon after which I received the following letter from Mr. Jones, containing a folution of the affair in the very fame manner as that proposed in this Tract: and as his letter has feveral corroborating proofs. I thought proper to affix it here, as also an extract from a Spanish Writer, containing some other strengthening circumstances, which I did not discover 'till I had printed the above-mentioned sheet.

The Rev. Mr. Jones's Letter.

SIR,

I HAVE lately been favoured with a fight of some printed Pages, containing that part of your work, in which you account for the peopling of the American Continent. The point does well deserve to be ex-

amined and cleared up; many writers, of little knowledge and lefs Faith, having made the obscure state in which that part of the globe remained for so many Ages, an handle for perplexing weak minds with doubts about the authenticity of some Articles related in the Holy Scripture.

I was much pleased to find, that, without knowing it, you are come to the same conclusion with myself, and, in part, by the same premises too. As we have both fallen upon the same scheme, without consulting one another, it is to be presumed, that neither of us

can be very far from the truth.

THAT the Western Continent did once communicate more nearly with Europe and Africa, than it does at present, I was first inclined to believe on reading the following account of Teneriffe, one of the Canary Mands. That the whole Island is deeply impregnated with Brimstone, and is supposed in former ages to have taken fire, and blown up all at the fame time.— That many mountains of huge Stones, calcined and burnt, which appear every where about the Island, were raifed and heaved up out of the bowels of the Earth at the time of that general conflagration; and that even the Pico Teneriffe itself was raised up by this means to that amazing height at which it is now feen. Huge heaps of these calcined rocks, or pumice stones, are spread for three or four miles round the bottom of the Pico, in fuch a manner, as to perfuade any beholder that it must have been generated by the sudden eruption of a Volcano: and even to this day, the mountain fmoaks and burns perpetually, and there remain the very tracts of the burning rivers of Sulphur, as they ran all over the South-western parts of the Island, and destroyed the ground past recovery. There is a Volcano in another of the Canaries, called the Palme Island, which raged so about twelve years

before this account was written, that it caused a violent Earthquake in Teneriffe, though at the distance of near twenty leagues, and the people ran out of their houses, fearing they would have fallen upon their heads."

Now as it appeared to me, from this relation, that the Pice was certainly thrown up by the eruption of a Volcano, and an Earthquake, in all probability the most violent that ever happened in the world, and fuch as must have made strange havock. The monument of this Catastrophe being so singular in its height, -a Thought suddenly struck me, that in some very remote age, a great alteration might have been made in this part of the globe, and a vast tract of land swallowed up in the Ocean, of which the Canaries, Azores, and perhaps the great banks of Newfoundland also, are fo many remaining fragments, standing like pieces of a wreck above the waves, and still exhibiting to us fome foot-steps, as it were, of the ancient path that once led from Africa to the West-Indies. I was so possessed with this notion, that I could not help proposing it to fome learned friends, long before I had heard of Plato's tradition, as a probable conjecture.

For these particulars, see Dr. Sprat's Hist. of the Royal Society, p. 200.

o This Supposition will not at all invalidate the Account given of the Formation of Mountains, p. 159; for the Pico is no other than a formless Mass or huge Heap of Rubbish, confishing of burnt Stones and Cinders, and was as certainly thrown out by a Volcano as the famous Monte di Cinere in the Lucrine Lake was, or as those little Islands or rather Moles in the bay of Sant-Erini in the Archipelago, were raised by subterranean fires and combustible Explosions in the year 1707 [see No. 314 of Philos. Trans.]. As neither of these Eminences have any thing similar to the horizontal strata or internal Constitution of Mountains; so they cannot come under the denomination of such, nor ought they to be called Mountains or Islands, as some writers have named them.

whereby the peopling of America might be accounted for; and endeavoured to recommend it to their confideration, by placing a terrestrial Globe before them.

You may imagine then, with what fatisfaction I found this opinion confirmed even beyond my hopes, when the passage you have extracted from Plato's Timæus first occurred to me. This passage is referred to by Pliny the natural historian, and it is hardly to be imagined, that fuch a curiofity in its kind should escape the notice of so indefatigable a Compiler; though it was of much less value to him then, than to us now. America was then unknown: and there was no prospect, that the tradition, which Solon pickt up in Egypt, would ever be confirmed as an article of true history by the discovery of a new world. Therefore Pliny speaks of it with some doubt, inserting the words-fi Platoni credimus: and some of the ancient Commentators on the works of Plato, did for the fame reason convert the whole into an Allegory. some excuse may be made for the Critics who did it in those days, but none at all for those who would do it now; as it must appear to any person that will confult the judgment of Serranus in this matter, who, in in his preface to the Timeus, is very fevere upon thefe unfeafonable allegorizers, and refutes them copioufly from the words of Plato himself. It was very ill-judged in Acosta, therefore to mention this story from Plato, and put it off with the obsolete pretence of it's being an allegorical discourse. He hath indeed urged some reasons in defence of what he says, but they are too trivial to deserve any particular consideration.

Acofta's Nat. and Moral Hift. of the Indies. p. 72.

In totum (mare scil.) abstulit terras, primum omnium ubi Atlanticum mare est, si Platoni credimus, immenso spatio. Plin. Nat. Hist. Lib. 2. cap. 90.

are obliged then to understand it as an historical tradition. Those who are inclined to slight it, and think the Earthquake Plato has described is incredible, because some fabulous circumstances are blended with the account, should endeavour to shew us, what could possibly give rise to such a Report in the eastern world: for that Plato should so expresly describe an opposite continent () καθανδικου ηπειρου) such as is actually now discovered, together with the way that led to it from the Streights of Gibraltar, and that this strange report should be grounded on no antient knowledge of the American continent, and prove to be true afterwards only by accident—all this would be more incredible than the matter reported, which, if the natural monuments of this great Earthquake, still fubfifting, are taken into the account, has all the appearance of truth that can be defired.

The celebrated Abbè le Plusche, Author of the Spettacle de la Nature, P tells us, it has been afferted by many learned men, that there was formerly a communication between Africa and America: but he unfortunately fupposes this opinion to have been wholly derived from a mistake in Ptolomy's antient Chart of the thenknown world, which stretches out the continent of Africa too far to the West; and observes withal, that the pretension is defeated by what Herodotus relates, of the voyage that was frequently made from the Red Sea, round the Cape of good hope, to the Pillars of Hercules; which could not have been, had the continent of Africa been extended to the West-Indies. This Objection will not in the least affect any thing you have said upon the Subject: for Herodotus is speaking of what was done long after the Division of the continents had

taken place; and even before that division, according to the Geography of Plato, there was a gulf which afforded a passage round the western coast of Africk, to

the mouth of the Mediterranean Sea.

No reasonable Objection, therefore, can be made to your Solution of this difficulty. Every candid Inquirer into Antiquity and Physical Knowledge, will hold himself obliged to you for the curious Observations you have thrown in by the way; and the piety of your defign must recommend it to every sincere friend of Divine Revelation.

BEFORE I conclude, it may not be impertinent to add, that although the more Southerly parts of the continent of America were originally peopled, in your way, from the countries that lie near the Mediterranean; it is by no means improbable, that the Northern parts may have received inhabitants from fome other

quarters of the Globe.

In a Natural History of Greenland, written so lately as the year 1741, by Hans Egidins, a Danish Missionary, we are informed, that it is yet undetermined whether Greenland does not join to America, on the North-west fide; round Davis's Streights. The Historian himself inclines to the affirmative. He adds moreover, that the Norwegians, who discovered it in 982, were not the first inhabitants; for that they found wild people an the West-side of the country, whom he takes to have been Americans. Now the Country of Greenland, to the South-east, is not so far, either from Iceland, Lapland, or Norway, but that various accidents in former ages, may have occasioned some communication between them. And thus much for the North-westerly parts of America. If we go to the North-easterly parts, it is still more probable, that some colonies may have been transplanted thither from Tartary. Father Avril, a Jesuit-Missionary of France, who with some others

undertook the discovery of a new way by land into China, met with a famous Naturalist among the Muscovites, who gave him the following account. 'That in the extreme parts of Tartary, to the Northeast, there is a great River, called Kawoina, at the mouth of which is a spacious Island well peopled. 'The Inhabitants go frequently, with their wives and ' families, upon the frozen Sea, to hunt the Behemoth, an amphibious animal, whose Teeth are in great request. It happens many times, that being surprized by a fudden Thaw, they are cut off from all commu-' nication with the land, and carried away, no-body knows whither, on huge floating Islands of Ice. For 'my own part (added this philosopher) I am persuaded, feveral of these Hunters have been carried to the most Northern parts of America, which are not far off: and what confirms me in this, the Americans of those parts have the same countenance and come plexion with those unfortunate Islanders, whom a 'violent thirst after gain, exposes in that manner to be transported into a foreign region." The Historian adds from his own Observation, that there are also, in that part of America, feveral of those creatures which are so common in Muscovy, and especially Beavers, which might have been conveyed by the same But to determine a matter of fuch importance, it should be enquired, whether there is any affinity between their languages; for if that should appear, there would remain no farther doubt, As to the Author you have undertaken to confute, he, it seems, would have America to have been exempt from that Deluge, by which the rest of the world was

overflowed. This, as you justly observe, is con-

· Avril's Travels, p. 176.

futed by a tradition among the Americans themselves concerning the Flood: and it is certainly put out of all dispute by the natural Evidence afforded by the country itself, in which the spoils of the Sea are found as plentifully as in other parts of the world. If I remember right, I once communicated to you some specimens of Fossil bodies that came from thence. Since that time, you must undoubtedly have enriched your Collection with a great many more from the West-Indies.

I am, Sir,

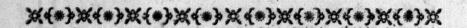
(Heastily wishing you all success in your laudable Undertaking,)

Your very sincere Friend,

WADENHO, June 20, 1761.

And obedient humble Servant,

W. 7.



AN EXTRACT FROM

L'Histoire de la Decouverte et de la Conquete du PEROU;

Traduite de L'Espagnol D'Augustin de ZARATE,

Par. S. D. C.

A AMSTERDAM; Ann. 1700.

ANY doubts and objections have been formed concerning the first people who some ages fince dwelt in *Peru*, and it has been often ask'd, How could they get thither, seeing this country is (as it really is) parted by such an extent of ocean from that where the first inhabitants of this world lived? It seems to me that this difficulty may be solv'd by an account given by *Plato* in his *Timæus* or *Dialogue* on *Nature*, and which he sets down more fully in the following (the *Atlantic*) Dialogue.

There he relates, that 'the Ægyptians said in honour " of the Athenians, that, after the defeat of some cer-" tain kings who came by fea with a numerous army, " they had part of a vast island called Atlantique, just " beyond the pillars of Hercules. That this island was " larger than all Afia and Africa together, and that "it was divided into ten kingdoms by Neptune, one " of which he allotted to each of his ten fons, beftow-"ing the largest and best on his eldest son Atlas." To this he adds divers particulars concerning the cuftoms and the wealth of this ifle, but above all about s a fumptuous temple in the metropolis, the walls of which were entirely deck'd and covered with gold and filver, and the roof covered with copper, with f many other particulars too long to enumerate here, and which may be feen in the original. It is certain 's that many of the customs and ceremonies mention'd by this author are yet to be seen in the provinces of Peru. From this isle one may pass to other large fislands beyond, and which are not far from the firm I land, near which is the true fea. But hear the words of Plato in the beginning of his Timaus, where Socrates thus harangues the Athenians, 'It is look'd on " as a fact that in times past your city resisted a great " number of enemies who came from the Atlantic Sea, " and had taken and possessed almost all Europe and " Afia; for then this strait was navigable, and near "it was an island just beyond the pillars of Hercules, "which they faid was larger than Afia and Africa put "together: from this island was an easy passage to others that were near it, and opposite the Continent or the main land bordering on the true fea; for one " may justly call that sea the true sea or ocean, and "the land I mentioned the Continent or main Land." ' Just below Plato adds, 'Nine thousand years ago happened a great change, the fea furrounding this " ifle swell'd fo high by a prodigious increase of water " that in one day and night it cover'd the whole island, " and fwallow'd and totally engulph'd it; and that " the fea in this place has been ever fince fo fill'd " with mud and fands, that no one can fail over it, " or pass by it to those other islands on the firm land." Some deem this relation an allegory as Marsilius Ficinus tells us in his notes on Timæus. Nevertheless most commentators on Plato, even Platinus and Ficinus himself look on this account not as a fiction but an bistorical Truth. Besides; one can by no means * think that the 9000 years which he mentions is a proof of its being a fable, because according to Eudoxus one must count them after the Ægyptian manoner, not as folar, but as lunar years, that is to fay, 4 9000 months, answering to 750 years. On this · fubject one may observe, that all Historians and Cosmographers antient and modern, call that Sea in which this island was engulph'd the ATLANTIC O-· CEAN, retaining even the very Name the island bore; which feems a fufficient proof that there had been · fuch an island. Admitting then the truth of this history, no one can deny this island (beginning near the straits of Gibraltar) to have been of that extent, from the north fouthward and from the east westward, as to be more than as large as Afia and Africa. By the other neighbouring illands are doubtless meant · Hispaniola, Cuba, Jamaica, St. Johns, and those on the Coast. By the Continent or Firm-land, (opposite to those isles) mentioned by Plato, is certainly meant · That land which is even to this day called Terra Fir-" ma, with the other provinces, which from Magellan onorthward comprise Peru, Popayan, Cas-del-oro, Paraguay, Nicaragua, Guatimala, New-Spain, Seventowns, Florida, the Bacallaos, and north up to Norway. Without doubt this vast tract of land is tet

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larger than the three quarters of the then known world. And one must not be surprized at this new world's not having been discover'd by the Romans, or any of those other nations that at different times abode in Spain; because one may reasonably imagine that the 'fore-mentioned supposed difficulty of navigating this sea then remained. This indeed I have heard faid, and can fee no difficulty in believing that this should easily prevent the discovery of this new-world mentioned by Plato. The authority of this philosopher is enough to convince me of the truth of this affair, and I make no question but our new found world is the same as that main Land or Continent of which he speaks; as whatever he has faid of it perfectly corresponds with our modern Discoveries; particularly in what he says of this land, that it is adjacent to the true sea, which is what we now call the Great South Sea; in comparison of the vast extent of which, the Mediterranen Sea and Northern Ocean are but as rivers. Having cleared up this difficulty thus far it feems no way hard to suppose, that men could easily pass from the Atlantic and its neighbouring Isles to what we call the · Continent or Terra Firma, and thence by land or even by the South Sea to Peru.

'Thus I have declared what feems to me most probable on a fubject fo perplexed, on account of its antiquity, and also because one can get no intelligence from the inhabitants of Peru; who know not the use of letters or writing to preserve the memory of things past. In New Spain indeed they have certain pictures which ferve them for letters and books; but in Peru they have nothing but knotted firings of various colours: It is true, by means of these knots, and the distance they are set at from

each other they comprehend (though but confusedly)

- any thing, as I shall shew at large in this history of of Peru. In regard to the discovery of these vast
- tracts of land, what Seneca says, as it were in a pro-
- phetical sense, in his Medea, seems to me to be not unapplicable,
 - " Venient annis Sæcula feris,
 - " Quibus Oceanus vincula rerum
 - "Laxet, novosque Tiphys detegat orbes."
 - " Atque ingens pateat tellus,
 - " Nec sit terris ultima Thule."
 - "In latest times our hardy fons shall brave
 - "Stern Oceans' rage, and stem the distant wave,
 - " In them reviv'd shall Tiphys wond'ring see
 - "The new-found world, emerging from the fea;
 - " No more shall Thule be the utmost bound,
 - " But earth from pole to pole be fearched round."

FINIS.



